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Minimum Wages Under Walsh-Healey Act

Secretary of Labor Perkins On Monday Issues Permanent Order Dividing the Country Into Districts With Wages Ranging From 35 Cents An Hour, or $14 Per Week, To 50 Cents An Hour, or $20 Per Week.

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., October 4, 1939—Secretary of Labor Perkins on Monday of this week set minimum wages for the paper and pulp industry under the Walsh-Healey Act meaning that any manufacturer furnishing supplies to the government must pay the wage set.

Preliminary wages were set on June 8 following which time representatives of manufacturers and the paper union met in Washington with Administrator Walling.

The permanent order issued Monday divides the country into districts with wages ranging from 35 cents an hour or $14 per week of forty hours to 50 cents an hour or $20 per week.

Wages Set by Groups

The following wages were set for the following groups:

For the States of Virginia, North Carolina, South Carolina, Georgia, Alabama, Tennesseee, Kentucky, Mississippi, Louisiana, Arkansas, Oklahoma, Florida, and Texas, 35 cents an hour or $14.00 per week of forty hours, arrived at either upon a time or piece work basis;

For the States of Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania, Delaware, Maryland, West Virginia, Ohio, Indiana, Michigan, Wisconsin, Illinois, Missouri, Iowa, Minnesota, North Dakota, South Dakota, Nebraska, Kansas, New Mexico, Colorado, Wyoming, Montana, Idaho, Utah, Arizona, Nevada, and the District of Columbia, 39 cents an hour, or $15.60 per week of forty hours, arrived at either upon a time or piece work basis;

For the States of Washington, Oregon, and California, 50 cents an hour or $20.00 per week of forty hours, arrived at either upon a time or piece work basis.

This determination shall be effective and the minimum wages hereby established shall apply to all such contracts, bids for which are solicited on or after October 15, 1939.

The complete decision follows:

This matter is before me pursuant to Section 1(b) of the Act of June 30, 1936 (49 Stat. 2036; 41 U. S. C. Sup. III 35), entitled "An Act to provide conditions for the purchase of supplies and the making of contracts by the United States, and for other purposes," (hereinafter called the Act). The Public Contracts Board, created in accordance with Section 4 of said Act by Administrative Order dated October 6, 1936, held a hearing on March 27, 1939, in the above entitled matter.

Notice of this hearing was sent to all known members of the industry, to trade unions, to trade publications, and to trade associations in the field. Invitation to attend the hearing was extended through the national press to all other interested parties.

Appearances were entered by representatives of several individual members of the industry, the American Paper and Pulp Association, the National Paperboard Association, International Brotherhood of Paper Makers, International Brotherhood of Pulp, Sulphite and Paper Millworkers, and Paper Workers Organizing Committee. Testimony was presented by representatives of the American Paper and Pulp Association and the National Paperboard Association.

Survey of Wages in 1938

A survey of the wages paid in the paper and pulp industry as of October, 1938 and supplementary data were received at the hearing and made a part of the record.

On the basis of the evidence, the Board made its findings and recommended that I find the prevailing minimum wage in the industry to be the amount indicated for each of the following groups of States: 35 cents an hour or $14.00 per week of forty hours, arrived at either upon a time or piece work basis, for the States of Virginia, North Carolina, South Carolina, Georgia, Alabama, Tennessee, Kentucky, Mississippi, Louisiana, Arkansas, Oklahoma, Florida, and Texas; 50 cents an hour or $20.00 per week of forty hours, arrived at either upon a time or piece work basis, for the States of Washington, Oregon, and California; and 40 cents an hour or $16.00 per week of forty hours, arrived at either upon a time or piece work basis, for the District of Columbia and the other 32 States.

On June 8, 1939, the Administrator, Division of Public Contracts, circularized the Board's recommendations in order that all parties might have full opportunity to register their objection or approval before a decision in the matter was made by the Secretary of Labor. Several briefs were filed expressing approval of or objection to the Board's recommendations. A brief objecting to the recommendations was

(Continued on page 26)

Wolf River Co. To Reopen Its Pulp Mill

Uncertainty In Delivery of Foreign Pulp Announced By Wolf Paper & Fibre Co. As Reason For Reopening of Pulp Mill Closed Last July — Fox River Mills Show Gain of 4.3 Per Cent In Employment In August.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., October 2, 1939—The Wolf River Paper and Fibre Company, Shawano, Wis., is preparing to reopen its pulp mill, according to announcement made last week. The mill had suspended operations in July, and its crew of 75 men will soon be back on the payroll. Domestic pulp shortages due to the inability to obtain foreign pulp is the reason for going back into production.

Production is gaining in numerous paper mills of the Fox River Valley, as evidenced by the employment reports issued by the Wisconsin Industrial Commission. Appleton recorded a gain of 1 per cent in the number of wage earners for August over July, and 4.3 per cent more than in August, 1938. Neenah reports an increase of 3.2 per cent in August over July, and 10.7 per cent over August a year ago. Menasha is 2.3 per cent above July, and 9.2 over August, 1939. Payrolls likewise have shown substantial gains.

Since the August reports were issued, there have been additional gains, and it is expected September will show the largest gain in some time. All of the pulp mills are operating at capacity to make up for the foreign imports banned by wartime shipping conditions, and there are prospects more of the closed pulp mills will be restored to operation.

Strengthening of prices is also evident in most lines, and many new price lists have already been issued to keep in line with the market.

Banta Co. Office Building Completed

George Banta Publishing Company, Menasha, Wis., has completed its three story office building and various departments are being moved into the new quarters. A portion of the building also will be used for storage purposes. The structure is of brick and steel. The reception hall and accounting divisions will be on the first floor, and the private offices, a library and stenographic departments are on the second floor. Considerable new equipment has been installed. stalled.

Consolidated Foremen Hold First Dinner

Forty members of the Foremen's Club of the Consolidated Water Power and Paper Company held their first dinner and meeting of the fall season September 28 at the Elks Club at Wisconsin Rapids, Wis. The speaker was Walter Chilsen, editor of the Daily Herald, Merrill, Wis., and his subject was world conditions and the need of adhering to the American system of democracy as well as to neutrality. He was introduced by Leo J. Barrette, Consolidated's employment manager. Fred Burt, president of the club, presided.

Nekoosa-Edwards Issue Calendar

Nekoosa-Edwards Paper Company, Port Edwards, Wis., has issued a mid-year calendar to the trade. It is 17½ by 30½ inches in size and dates from August 1, 1939 to July 31, 1940. On its pages are texts relating to the dependency of civilization, history, medicine, education, communication, invention, architecture, art, commerce, agriculture, science and finance upon the use of paper. The illustrations are elaborate silhouettes on a background of blue.

Kimberly-Clark Employees in Safety Contest

Employees of the Kimberly-Clark Corporation's mill at Kimberly, Wis., have completed a safety contest run in baseball style. The "Cubs" defeated the "Red Sox" in the finals of a series of question bees on safety, scoring 1,070 points against 875 for the losers. Members of the winning team are: Harold W. Forster, planning department; Miss Beatrice Willis, finishing room; Clarence Moynette, finishing room; and Edward Derricks, millwright. Dudley Courchane is safety director at the mill.

Strange-Caley Engagement Announced

Announcement was made at a dinner at Riverside Country Club, Menominee, Mich., September 22, of the engagement of Miss Gretchen Caley of Menominee, and John Paul Strange, Jr., Neenah, Wis. No date has been set for the wedding. Mr. Strange is associated with the John Strange Paper Company, Menasha, Wis., of which his father is vice-president. He is a graduate of St. John's Military Academy and Lawrence College.

Hammermill Buys Paper Machine

[FROM OUR REGULAR CORRESPONDENT]

WATERTOWN, N. Y., October 2, 1939—Announcement is made by the Bagley & Sewall Company of the sale of a large paper machine to the Hammermill Paper Company, Ltd., of Erie, Pa. The machine is one recently acquired by the concern following the purchase of the Malone Paper Company at Malone. The machine is understood to be in excellent condition but will require some additions to the calendar stack and some minor improvements before shipment. The repairs will require a few weeks. The Hammermill Paper Company is among the best known manufacturers of bond papers in the country and the new machine will be utilized in the manufacture of that grade of paper. It was stated by Abe Cooper, new owner of the Bagley & Sewall Company, that he has hopes of disposing of the newly acquired Malone mill to parties who will resume operations and again give employment to many persons. Only a few weeks ago the local concern sold a large machine to the Smith Paper Company, of Lee, Mass., for the manufacture of lightweight papers.

Strathmore Holds Sales Meeting

BOSTON, Mass., October 2, 1939—A sales meeting of the Strathmore Paper Company, West Springfield, Mass., was held Saturday morning at 8 o'clock at the office of Carter Rice & Co., Corporation, with E. M. Hughes presiding. A similar meeting is held each year.

New Abitibi Stock Plan Will Be Ready Soon

Final Details of Plan By An Independent Committee Will Give Bondholders Equivalent In 5 Per Cent Issue of Senior Shares — Shortage of Labor In Woods Feared—Manufacturers Facing Rising Materials Costs.

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., October 2, 1939—Final details of the plan formulated by an independent committee formed to study the situation surrounding the Abitibi Power and Paper Company, Limited, Toronto, have, it is understood, been completed and will soon be presented to interested groups of security holders. The plan, it is known, will give bondholders who claim total $70,000,000, the equivalent in a five per cent issue of senior shares and the theoretical equity of $50,000,000 held by junior security holders will be satisfied by a junior issue of shares on which dividends would be subject to the senior claim of the preferred shares under this proposal. In the meantime, it is understood that the bondholders protective committee or Symington committee which has been going ahead with its plan or procedure involving foreclosure under the first mortgage, has decided to acquiesce to the request of the Ontario government to delay foreclosure for the time benig and accordingly has postponed action.

Great Lakes May Act on Preferred Payments

It is understood there is a possibility that directors of the Great Lakes Paper Co., Limited, Fort William, Ont., may give consideration to the payment this fall on the outstanding Class A and Class B preferred shares. These issues carry a cumulative dividend rate of $2 a share from October 1st, 1935, and as no distribution has been made to date will be in arrears of dividend $8 per share at the first of the month.

Shortage of Labor in Woods Feared

With so many young men withdrawn from industry it is feared there will be a shortage of lumber and pulpwood operators in Northern Ontario this winter. In the Fort William area it is reported that more than 200,000 cords of pulpwood will be cut this season. Delays in shipments from Scandinavian countries and increased demand from United States papers are responsible for the increase. One leading pulpwood firm says while the newsprint producers will not increase their prices for the next few months at any rate, importations from Europe will probably come to a standstill and, with the increase in consumption of all kinds of paper and pulps in America, there is no doubt that this situation will be reflected in the value of pulpwood and producers will be forced to augment their prices. If the war lasts for any length of time pulpwood will certainly go up. With a jump in commodity prices and with the threatened shortage of labor, wood will have to sell for more money. This firm does not believe that wood will command the figures of 1914-1918 and the increase should be less spectacular.

Manufacturers Facing Rising Materials Costs

One of the difficulties to be faced by the manufacturers of fine papers under current conditions is that of rising costs and sufficient supplies. In this case their position is not much different from the makers of newsprint and pulp. There are, on the other hand a number of special materials, needed in making fine papers such as rags and clay much of which are imported. During the period 1914-20 costs mounted rapidly which in turn was reflected in selling prices. Consumption was kept to a minimum although war time demands made for increased requirements of paper and paper products. The producers of fine papers in Canada during the last few years have made a much better showing of earnings than the newsprint mills. It is feared, however, that an expansion in profits would likely bring them within the scope of the newly enacted Canadian excess profit tax. Taken as a group the book and writing paper mills are not earning an adequate return on capital but the margin between the return allowed by the government and when the tax comes into effect is almost negligible compared with the newsprint and pulp companies.

Prospect for Paper Box Producers Brighter

The prospect for paper box makers and allied lines is growing brighter. There was a price battle on this spring and this has been largely eliminated. The first price increases have already been put into effect while others are reported to be under way. There is however, another side to the picture and that is any advance in the figure for the finished article will be offset by higher costs for materials. The operating position of the firm should be better. Then another factor for better conditions is that pressure from United States firms will be less heavy owing to the discount on the Canadian dollar. Thus the menace of imported containers is disappearing and with better conditions in the United States a serious cause of price disturbance is likely to be removed.

Expanding Use of Kraft Products

So far as sulphate or kraft papers are concerned there has been a greatly widened use. Canned goods and many other products are now shipped almost exclusively in containers which are largely made of kraft. While the industry in Canada has been handicapped by competition created by imports south of the border the dumping due to excess produtcion has ceased. The war situation has altered the outlook for this branch of the paper business and it is expected that prices will ascend.

Mrs. William Russell Dead

GREENFIELD, Mass., Oct. 2, 1939—Mrs. Kate S. Russell, one-time New York resident, died October 1 in her home here at the age of 84. She was the widow of William Delano Russell, one of the founders of the International Paper Company of New York and its vice president from 1911 until his retirement in 1922. Mr. Russell died at Greenfield in 1937. For sixteen years his widow had been recording secretary of the New York State women's organization for foreign missions of the Congregational Church.

Chicago Reports Rising Consumer Demand

First Speculative Buying Wave Receding and Demand Is Now Largely Supported By Increasing Orders From Consumers—Dr. Tanner To Serve Paper Chemistry Institute—SAPI Announce Golf Winners—Other News.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., October 2, 1939—The Chicago paper market continues to be somewhat unpredictable though there is reported to be a noticeable lessening of hysteria and a slight leveling off, considered by local paper executives as an indication of normal Fall buying. Investigation reveals the fact that merchants and convertors seem to have filled their immediate buying requirements to a major extent and that demand is now largely coming from the consumer. The market continues to be definitely of the "seller" variety though prices have held practically steady. Grades which announced increases in the last two weeks have held these spots with little indication that prices will go materially further upward. The statement that the kraft market will have its November prices out next month and that these will not be above four cents is reported to be characteristic of an orderly development in all the markets and of a healthy condition. Book and cover papers continued to be in good demand as business responded to improved trade. Newsprint and groundwood commitments continued heavy with brisk demand. The bond and ledger market is reported to have turned more to normalcy during the week.

H. S. Daniels Promoted

H. S. Daniels, formerly Chicago branch manager and Western sales manager of the Union Bag and Paper Corporation has recently been appointed vice president and general manager of the corporation. Mr. Daniels, well and favorably known in the Chicago area, has been with Union Bag for twenty years, service as a vice president since 1933.

SAPI Announces Golf Winners

Perfect fall weather and the importance of the event combined to make the annual golf outing of the Salesmens Association of the Paper Industry a "perfect party." Held in conjunction with the Fall meeting of the N.P.T.A., the event drew 120 members and guests who enjoyed the luncheon, golf and impromptu dinner program which carried on well into the night.

Prize winners as announced by hard working golf chairman George Craft are as follows: Los gross, D. T. Quirk, Peninsular Paper Company; low net, 17 and under, E. Vana, International Tax and Salesbook Company; low net, 18 handicap and over, H. W. Stark, Jr., Rexford Paper Company and E. O. Meyer, Flambeau Paper Company; second low net, 18 and over, H. E. Hands, American Lace Paper Company and Carroll Mitchell, Graham Paper Company; third low net, 18 and over, W. A. Jones, Riverside Paper Corporation; low net, first nine, C. W. Sherman, Seaman Paper Company; low net, second nine, Ed Dahl, Rhinelander Paper Company; low putts, first nine, L. E. Moeller, Messinger Paper Company; low putts, second nine, Dee Frisbee, Midland Paper Company; high gross foursome, F. B. McFarland, Port Huron Sulphite and Paper Company; J. C. Mills, Port Huron Sulphite & Paper Company; A. B. Tucker, Parker, Thomas & Tucker Paper Company and J. F. Shoener, Parker, Thomas & Tucker; low net foursome, J. W. Sterling, Rexford Paper Company; H. W. Stark, Rexford Paper Company, Dave Kennedy, Southern Kraft Corporation and Art Atkenson, Southern Kraft Corporation; low putt foursome, F. W. Cole, Frasier Industries, Inc., H. Vose, Berkshire Papers, Inc., George Liebert, Standard Register Company, and D. T. Quirk, Peninsular Paper Company; blind bogey winners, J. G. Conley, Frasier Industries, Inc., Carr Sherman, H. P. Smith Paper Company and Henry Fulton, Blunden-Lyon Company.

Dr. Tanner Aids Research Work

From the University of Illinois comes the news that Dr. F. W. Tanner, professor of bacteriology at the University, will serve in an advisory capacity for the Institute of Paper Chemistry which, in behalf of the American Pulp and Paper Association, plans to make an extensive study of the use of paper in the food industries as a distinct contribution to the sanitary packaging of foods. Dr. Tanner plans, according to the report, to work closely with a special committee made up of experts from the paper industry itself bringing together experts in both the food and paper industry with possible far reaching results for the paper trade. Dr. Tanner, working with the Institute which has designed a program to prevent duplication of research, is the author of many authoritative treatises on foods including "The Microbiology of Foods." The paper industry is obviously bearing in mind the importance of research and of authoritative backing in the successful introduction of the paper milk container and is quoted as intending to know exactly where paper products can be most hygienically used before any actual production is undertaken.

Federal Reserve Figures Show Gains

Paper and its products, as represented in the classifications of the Seventh Federal Reserve District from the wholesale trade tabulations experienced a heavier volume of business in August according to recent reports. Net sales for August as compared to July, 1939, showed an increase of 9.3 per cent; stocks increased 1.8 per cent; accounts outstanding were up 4 per cent and collections were up 7.3 per cent, the division making an excellent showing in comparison with other lines. Employment and earnings in the industrial group representing Wisconsin, Indiana, Michigan, Illinois and Iowa likewise showed some improvement. The 738 reporting firms in the paper and printing group showed 76,653 wage earners for the week of August 15 or an upturn of 0.6 per cent as compared to the week of July 15. The earnings of $2,184,000 were 0.4 per cent ahead of the same period a month ago. The total for the 14 groups indicated a 1.9 per cent increase in wage earners and of 5 per cent in earnings for the period.

Canadian Newsprint Price Policy Praised

Resolutions Adopted After Recent Large Meeting of Canada's Newsprint Industry To Assure Customers Continuous Supply At Stable Price Highly Commended—Newsprint and Pulp Exports Increase — Other Mill News.

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., October 2, 1939—The Hon. Frank Carrel, former proprietor of the Quebec Chronicle-Telegraph and a large shareholder in Canadian newsprint manufacturing concerns, has made public a letter written to an official of one of the leading pulp and paper corporations in which he commends highly what he describes as "the recent meeting" of the Canadian representatives of the newsprint industry, the largest ever held within recent years, and their decision and policy with regard to the treatment of their best customers in the United States on the eve of the present war." It was following this meeting that the Canadian Newsprint Association issued a statement declaring the policy of Canadian newsprint manufacturers to do their utmost to protect their customers in regard to price stability and continuity of supply, and to prevent by every means in their power the development of a runaway marked for newsprint.

International Committee Long Advocated

Mr. Carrel has for over five years been advocating the appointment of an international commission or committee representative of the two great interests in this industry—the manufacturers and the consumers —with the object of making a survey of the whole situation, threshing out the misunderstandings and endeavoring to arrive at a solution that would lead to a more friendly trade relationship for the mutual benefit of both interests.

He has personally interviewed many leading newsprint consumers in the United States, and he says that in every newsprint office he visited he found a strong and friendly desire to co-operate with the Canadian manufacturers. But it was essential, he felt, to remove the suspicion and resentment which "our follies, errors and ill-advised policies, government and otherwise, have helped to create—a relationship the opposite of what should exist between seller and buyer."

Newsprint and Pulp Exports Increase

Government statistics just released show that in August total newsprint exports amounted to 4,709,735 cwt., valued at $10,194,899, as compared with 4,392,214 cwt., valued at $9,621,715 in August, 1938. Total wood pulp exports were 1,461,357 cwt., valued at $2,939,109, as compared with 1,166,966 cwt., valued at $2,833,241 in August, 1938. The value of total paper and manufactures of paper for the eight months ending August is $76,613,440, as compared with $70,810,241 for the similar period a year ago.

No Advance in Stumpage Rates

A despatch from Saint John, N. B., says: "A most effective contribution to the successful prosecution of the war has been made by New Brunswick in the announcement by Hon. F. W. Pirie, Minister of Lands and Mines, that there will not be an anticipated advance in the stumpage rates. Present industrial conditions due to the demand for timber products would ordinarily have justified a substantial increase in stumpage rates this year but the Provincial Government felt that the most immediate and effective means of co-operation with the Mother Country would be a rapid expansion of the timber trade in order that lumber products may be made available for utilization in the present great war with Germany. The contribution of the government in not increasing the stumpage rates will permit of a vigorous policy of endeavor on the part of the operators throughout the province.

"Based on experience gained during the last war lumber will play a most important part in supplying the needs of the people and forces of the United Kingdom. Spruce and hardwoods are particularly in demand as war materials and the province will be called upon to supply these species in large quantities as the war progresses.

"Hon. Mr. Pirie in making the announcement stated that with no increase in the stumpage rates there will be stimulated activity in the trade in the province."

Large Demand For Sulphite

Canadian sulphite pulp products have been forced temporarily to withdraw from the export market quotations for future delivery as a result of a new situation created by the war. Not only has there been a sharp demand from U. S. buyers, but developments in Europe, where sulphite has been classed as contraband by Germany, have further complicated the picture, inasmuch as Britain also is vitally interested in a sulphite supply, and in general British requirements have been given precedence in Canadian exports. Thus, for the time being, Canadian producers are awaiting further developments before committing themselves to new sales contracts and export policies. Canada's sulphite production in the past has been sufficient to take care of domestic requirements, leaving a moderate amount available for export.

Big Plant Expansion for Bathurst

R. L. Weldon, president of Bathurst Power and Paper Company, has announced a program for capital additions of approximately $400,000 to provide for further plant efficiency and says some expansion of production will be proceeded with at once. Plans have been in hand for some time and were dependent on Kraft liner board prospects and a long term outlook as to general economic conditions. Present indications are that the program will be completed within the next eight or nine months.

The new development, it is understood, is not based wholly on the immediate market improvement for Kraft liner board.

A considerable market has been developed in the production of corrugated cartons and with every indication of an expanding movement of package goods of all kinds, particularly of foods and partly processed materials, a bigger foreign and domestic demand is regarded in trade quarters as a certainty.

Philadelphia Reports Increasing Orders

Problems of Manufacturers and General Paper Merchants Intensified By European Situation—Price Rise Due To Buying For Future In Anticipation of Scarcity—Philadelphia Paper Trade Association Members Meet.

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., October 2, 1939—The European situation has intensified the problems confronting both the paper mills and merchants, and the situation is somewhat confused. Over the signature of Frederick I. Brower, mill representative for the Atlantic Gummed Paper Corporation, the following letter was sent out to the trade:

"Is the present onward rush of prices justified?—It is anyone's guess.

"It seems probable that the sudden price advances are due to speculation in anticipation of a scarcity that does not actually exist—momentarily, at least, there is no foreign demand for raw materials or finished products.

"There is an overplus of cotton and other commodities—also there are manufacturing facilities to take care of greatly increased demand. A little time is needed, however, to work out the present congestion of orders that have choked up mills and factories in every line of business. Materials in the hands of speculators must find their way into the market and if increased demand and consumption do not absorb them, prices will retreat.

"Atlantic Gummed Paper Corporation is faced with an average situation. Suppliers offer no coverage on futures, hence we must buy 'at the market' from day to day, and prices continue to advance. Deliveries of raw materials are slow and in insufficient quantities to take care of orders on the books. Our own shipping schedule is therefore behind normal.

"New business is being refused in an effort to supply regular customers and if present conditions continue to exist, it may be necessary to allot tonnage based on a customer's normal requirements over the past twelve months. We do not suggest speculation in anticipation of still higher prices—there could be a break, although it does not seem likely. Again, if the arms embargo is repealed anything can happen to prices—it is still anyone's guess."

Philadelphia Trade Association Meets

Members of the fine and wrapping paper divisions of the Philadelphia Paper Trade Association held two meetings during the week to hear the reports of the representatives of the respective divisions who attended the Fall Convention of the National Paper Trade Association in Chicago. The wrapping paper division members held a dinner meeting at the Bourse on Tuesday evening, at which W. B. Killhour, Jr., president of the Philadelphia Paper Trade Association, and delegate to the Convention for this division, gave a very interesting report of his observations while there. The guest speaker of the evening, George L. Ward, president of D. L. Ward Company, who had also attended the Chicago Convention, gave a résumé of his findings of the joint industry meeting.

On Thursday last, members of the fine paper division met at one o'clock in the headquarters of the Association, 631 Drexel Building, and listened to a very interesting report of his observations on fine paper activities at the Convention by LeRoy Bishop, treasurer of the Paper Trade Association of Philadelphia, who represented that division. President Killhour reported at length on the speech made by J. Javits, Esq., national counsel on legal matters. At both the fine and wrapping paper division meetings, a report of the survey made by the Statistical Department of the National Paper Trade Association in both divisions, was highlighted. This report dealt with a survey of operations in the above divisions during the first six months of 1939 and showed a slight additional volume over preceding months with profits still low and rather negligible.

Indianapolis Demand Subsides

[FROM OUR REGULAR CORRESPONDENT]

INDIANAPOLIS, Ind., October 2, 1939—A decline in volume during the last week of September lead the paper trade here to believe that the short period of speculative buying due to European conditions, had passed. This was particularly noticeable in the fine paper field where for two weeks there was a rush for paper on the part of consumers who feared that prices would soar sky high. As a result, one prominent jobber here said it was doubtful if September would show any increase over August in spite of the one lively period. Local jobbers, seeking to place orders, are having to await their turn at the mills, which are reported to be covered with orders. When orders began to pour in because of the situation in Europe, jobbers found their stocks badly unbalanced and depleted in a short time. It is apparent that conditions in all parts of the country were the same, for when local jobbers sought quick orders, they found mills also with short supplies and they have had to wait for deliveries for the first time in several years. There have been slight rises in some items of the fine paper field, but every effort is being made to keep prices in line and now that the first rush is over, this doubtless will be accomplished.

Kraft demand continued good last week and volume will be better for September than it was for August. Prices also have been advanced. Tissues followed the general trend, with price advances and an increase in orders.

Building paper demand fell off to some extent. Prices are strong with every indication of advancement, but building has dropped somewhat and retailers are reluctant to buy until the late fall demand is more clearly established. Most dealers are reported with fair stocks on hand.

Container demand is advancing in spite of the fact that the milk and ice cream trade has fallen off due to the lateness of the year.

Paper stock men, who reduced their warehouse stocks last month, now are holding their merchandise, hoping for a further rise in prices.

Financial News of Pulp and Paper Industry

Improved Operating Conditions Produce Union Bag Profits — Reasons Outlined For Added Valuations of Newsprint Securities — Non-Residents May Receive Dividends In Foreign Funds—Central Reports Profit.

New York Stock Exchange

High, Low and Last for the Week Ending October 4, 1939

	High	Low	Last
A. P. W.	3¼	3¼	3¼
Armstrong Cork Co.	38¾	36¼	37½
Celotex Corp.	11⅜	10¼	10¼
Celotex Corp., pf.	60	59½	59½
Certain-Teed Products Corp.	7¾	7	7
Certain Teed Products Corp., pf.	30½	28¼	29¼
Champion Paper & Fibre Co.	28	27	27
Champion Paper & Fibre Co., pf.	100	100	100
Congoleum-Nairn Co.	22½	21½	21¾
Container Corp. of America	16⅜	15	15¼
Continental-Diamond Fibre Co.	8¾	8⅛	8⅛
Crown-Zellerbach Co.	15⅞	14⅝	14⅞
Crown-Zellerbach Co., pf.	89	87	87
Flintkote Co.	18	17½	17¾
Robert Gair	5½	4¾	4¾
Robert Gair, pf.	16⅞	15¼	15¼
International Paper & Power	13⅞	12½	12⅞
International Paper & Power, pf.	49⅞	45½	46⅜
Johns-Manville Corp.	77⅜	75	75
Kimberly Clark Corp.	36⅞	35¾	35¾
MacAndrews & Forbes	28¼	28¼	28¼
Masonite Corp.	35	33	33¼
Mead Corp.	13¾	11⅛	11¾
Mead Corp., pf.	67	64	67
Paraffine Companies, Inc.	41⅞	41⅞	41⅞
Paraffine Companies, Inc., pf.	92¾	92	92
Ruberoid Co.	20⅛	19	19
Scott Paper Co.	47	46⅝	46⅝
Sutherland Paper Co.	24⅝	24½	24⅝
Union Bag & Paper Corp.	12¾	11½	11¾
United Paperboard Co.	7⅛	6¼	6¼
U. S. Gypsum Co.	74¼	72½	74¼
U. S. Gypsum Co., pf.	154	149¾	154

New York Curb Exchange

High, Low and Last for the Week Ending October 4, 1939

	High	Low	Last
American Box Board Co.	8¾	8¾	8¾
Brown Co., pf.	23	19½	22
Great Northern Paper	43¼	42¼	42¼
St. Regis Paper Co.	4	3⅜	3⅜
St. Regis Paper Co., pf.	60	59	60
Taggart Corp.	4¾	4¼	4¼

Union Bag Increase Earnings

Although bag and paper prices in August were nearly 10 per cent under the average prices of 1938, and more than 10 per cent below prices prevailing in the first half of 1939, Union Bag and Paper Corporation earned $85,000 in August, net after all charges including provision for Federal income taxes, according to a statement issued today by Alexander Calder, president. This profit was greater than that earned by the company in the entire second quarter this year, Mr. Calder said. July operations also yielded a modest profit, and "it is not unlikely that the third quarter will show earnings approximating the $232,365 earned in the first six months this year," Mr. Calder estimates.

'The August showing was made solely on the basis of the improvement in operating conditions effected by the company, and without any benefit from the price rises in both kraft paper and bags which have taken place since the outbreak of the new European War," Mr. Calder stated. "September sales have been running in greater volume than August and although the higher prices will be reflected in only a minor degree on the month's business, even with a shorter business month September's earnings are likely to top the $85,000 of August and put the third quarter's profits over $200,000.

"Advances which have been announced in the price of paper bags since the start of the war, amount to about $30 a ton. Because of the tremendous rush of orders, Union Bag has been forced to withdraw all quotations, and like most other paper companies is sold out for some time ahead," according to Mr. Calder.

"In the paper industry, although many of the mills have temporarily withdrawn prices, a few announcements have been made quoting advances as high as 25 per cent. With foreign kraft pulp up about $10 a ton on current shipments and delivery very uncertain, the converting mills must necessarily pass this cost increase along in their prices. This fact, coupled with the increasing demand for kraft paper, points to higher industry levels which will obviously be of greatest benefit to the integrated mills, since the only likely increase in costs for United States pulp producers is in saltcake, which is the major chemical used to cook the wood chips to make pulp. A large part of this saltcake has been obtained from Germany heretofore, but the domestic supply is being expanded to make up for the cessation of German exports. Saltcake costs $13 to $14 a ton, and about 250 lb. are used to make a ton of kraft pulp.

Activity in Newsprint Securities

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., October 2, 1939—Newsprint stocks have been taking the leading role on the Montreal Stock Exchange since the war broke out, and millions have been added to the valuations of the leading pulp and paper issues. Outlining the reasons for the immediate response of this class of securities to the outbreak of war, one leading firm of brokers, in a market letter, says it is based on the following influences of advantage to the industry:

1. Enjoyment of the prevailing premium on New York funds in relation to the Canadian dollar on all shipments to the United States, payment for which is in New York funds;

2. A large share of the sharp increase in consumption of newsprint in the United States and Canada under the stimulus of War news;

3. A high percentage of the newsprint until now imported by the United States from Europe has been cut off through difficulty in transportation and almost prohibitive freight and insurance rates—subject to the fact that this increased market will be offset to some extent by an enforced reduction, for similar reasons, in Canadian shipments to overseas customers in Great Britain, Australia, New Zealand, South America and elsewhere;

4. Supplementary profits accruing to various newsprint mills from better markets for subsidiary products, such as bleached and unbleached pulp, kraft paper and board and other papers—as well as lumber;

5. Higher profits that normally accrue to newsprint mills on all output through the lower unit of cost arising out of a higher operating ratio in relation to installed capacity;

6. The important fact that probably prices of newsprint shares (before the recent advance on War news) were abnormally depressed, being among the few groups on the Canadian stock exchanges that, a couple of weeks ago, were lower even than in the "Munich" period;

7. The existing surplus capacity of Canadian mills is sufficient to enable them to take care of a very heavy expansion in demand; they could readily cope with one of 1,000,000 tons in a single year, providing wood supplies are adequate and idle machinery is brought up to operating perfection;

8. While the expressed policy of the Canadian producers is to maintain current prices at stabilized levels (dependent on the factor of increasing costs), the mills could show a great gain in net earnings merely from a large increase in output and sales, without a rise in newsprint prices.

Canadian Payments to Non-Residents

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., October 2, 1939—American holders of securities in Canadian hydro-electric power concerns, pulp and paper companies and other Canadian enterprises will be interested in the news that non-resident clients of members of the Montreal Stock Exchange and the Montreal Curb Market may now receive dividends, regularly payable in foreign funds, in such foreign funds. According to a new ruling issued by the two Exchanges, brokers, in the case of non-residents, no longer need have dividends payable in foreign funds converted into Canadian dollars before forwarding the dividend to the client. A permit to this effect may be obtained from an authorized dealer of the Foreign Exchange Control Board, as provided in Regulation 14 of the Board, issued on September 23rd.

In view of Regulation No. 14, the provisions in the by-laws of the Montreal Stock Exchange and the Montreal Curb Market which state that dividends are payable in the currency of the country where the company's dividend cheques are payable have been rescinded, and replaced by the following ruling:

"Until further notice, all dividends in foreign funds shall be payable in Canadian funds at the same rate of exchange as obtained by the broker converting the funds, except for the account of a bona fide non-resident when a permit may be secured under Regulation No. 14 of the Foreign Exchange Control Board, dated September 23rd, 1939."

This ruling by the Exchanges also supersedes the previous announcement, made on September 19th, to the effect that all dividends would have to be paid in Canadian funds.

Regulation No. 14 of the Foreign Exchange Control Board states as follows:

"Any authorized dealer may provide foreign exchange to a non-resident owner of foreign securities for any bond-coupon, coupon certificate, dividend cheque or other similar instrument payable in foreign currency and representing interest or dividends due and payable on such foreign securities, or may issue a licence to export any such bond-coupon, coupon certificate, dividend cheque or other similar instrument.

The expression 'owner' as used herein includes any agent, trustee or banker for the owner of the securities in question."

Testing Co. Enters Its 60th Year

The United States Testing Company celebrates its 60th anniversary next year, having been established on September 20, 1880 by Messrs. Poidebard and Muzard, as the New York Silk and Wool Conditioning Works.

The certificate of incorporation of the United States Silk Conditioning Company was executed in 1907 and as the company's business expanded and increased along new lines, the name of the company was shortened in 1920 to the present name, United States Testing Company, Inc.

In view of the great expansion of the company since its incorporation, it is significant that D. E. Douty, then of the Bureau of Standards, Washington, D. C., now president of the Testing Company, in writing to the officers while his engagement was under consideration back in 1912 said:

"Unless the laboratories of the United States Conditioning and Testing Company are to be conducted on liberal lines leading to a position of national importance, I should not wish to change. Furthermore, I should be the wrong man for the place."

In connection with its 60th anniversary, the Testing Company has prepared a booklet for limited distribution, titled "The History of a Great American Laboratory," which gives in chronological order, the history of the United States Testing Company from its origin up to the present day.

T. B. Wood's Sons New Distributors

The T. B. Wood's Sons Company, Chambersburg, Pa. has appointed M. L. Erlenmeyer, of Elmira, N. Y., distributor for its complete line of power transmission machinery, in and about Elmira. There will be carried in stock the complete line comprising Wood's V groove sheaves, V belts and all types of standard power transmission machinery. Berger Brothers Electric Motors, Inc., of Rochester, N. Y., has been appointed distributor for the complete line of Wood's V groove sheaves and V belts, and Boyer-Campbell Company, of Detroit, Mich., has been selected as distributor for Detroit and vicinity for the sale of Wood's V groove sheaves.

Central Nets $121,328

The Central Paper Company, Inc. for the year to June 30, reports a net income of $121,328, equal, after preferred dividend requirements, to 54 cents each on 145,578 common shares, compared with $62,424, or 14 cents a common share, in preceding year.

R. B. Moir Goes with Foote Bros.

R. B. Moir, who resigned recently as chief engineer of W. A. Jones Foundry and Machine Company has become associated with Foote Brothers Gear and Machine Corp. as Director of Sales Research and Engineering Development.

Ohio Wax Paper Votes Dividend

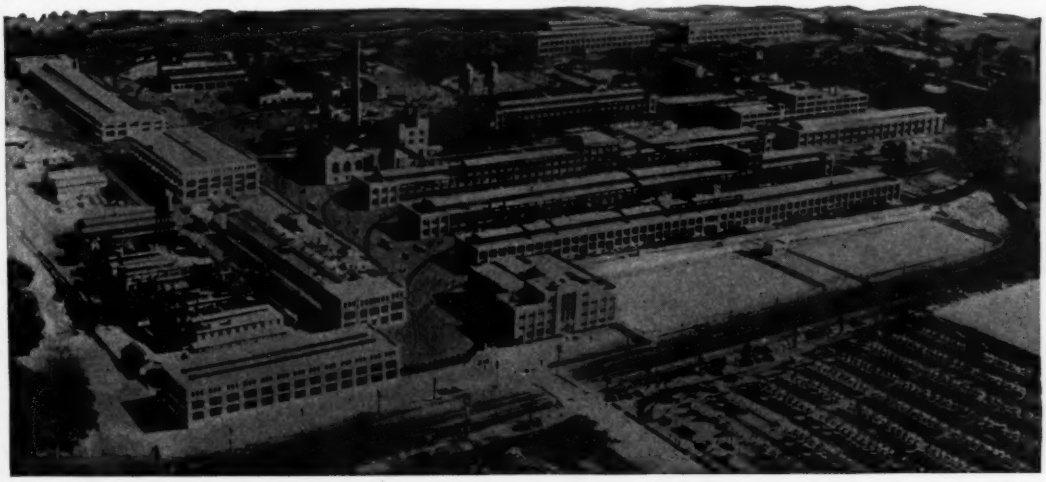
The Ohio Wax Paper Company voted an extra distribution to 25 cents a share on the common stock, payable October 1 to stockholders of record September 20.

THIS TIME

there's a big DIFFERENCE

Calco Plant in 1915

Calco's Present Plant at Bound Brook, N. J.



THERE'S a big difference between Calco's modest plant of 1915 and the 110-acre Bound Brook plant whose facilities are now shared by Heller & Merz. But this difference is no more than typical of the difference between this country's chemical industry of 1915 and of today.

This is but one of many specific instances which might be cited to show the amazing growth of domestic producers of dyes, intermediates and related chemicals. America's chemical industry as a whole has developed to the point where domestic products can now supply well over 90% of the country's dyestuff needs—compared to our scant 10% capacity in 1914. As is the case with Calco and Heller & Merz products, domestic production on the whole equals or *exceeds* in quality that of foreign sources.

We suggest that you keep your orders in step with your actual needs. That will help us (and other chemical manufacturers) maintain the normal schedules that are so important in keeping production on an efficient, *economical* basis. We'll *both* benefit by that!

We also point out the advantage of looking to a large, well-equipped organization such as Heller & Merz for your dyestuff and chemical needs. For unforeseen developments may necessitate giving preference to established customers in the filling of orders.

HELLER & MERZ
90 West Street, New York, N. Y.
Boston • Chicago
Springfield, Mass. • Philadelphia

Calco — HELLER & MERZ PRODUCTS

Division of THE CALCO CHEMICAL CO., INC., Bound Brook, N. J.
A Division of American Cyanamid Company

N. E. TAPPI and Superintendents Meet

The New England Section of The Technical Association of the Pulp and Paper Industry and the Connecticut Valley Division of the Superintendents Association met at the Pittsfield Country Club, Pittsfield, Mass. on Saturday, September 30th.

A golf tournament was held in the afternoon with the following results: Low net, Ralph Wilkins; the TAPPI trophy, F. H. Schneider; Superintendent's Cup, Howard Ferguson; other prizes went to Peter Sinclair, James W. Hager, Alfred Cosby, Francis Gillespie, S. A. Brunnel, Dick Stroud and Claude Smith; the contract bridge prize went to Mrs. Lester Crouse.

Superintendents Elect

The officers elected to serve for the coming year were: chairman, M. O. Morris, Case Brothers, Inc.; 1st vice chairman, Leroy Frisbie, Westfield River Paper Company; 2nd vice chairman, Ollie Messner, Robertson Paper Box Company and secretary-treasurer, Thomas Bowen, Parsons Paper Company.

Dirt Removal

The guest speaker was F. K. Becker of the Bird Machine Company, East Walpole, Mass., with his subject "The Removal of Dirt from Papermaking Stuff."

Mr. Becker gave an interesting paper regarding the ever present problem of removing dirt from paper stock. He stated that the standards during the last few years have been raised to much higher levels than previously but it was inevitable, due to the competition in the paper field.

The machinery manufacturers have kept pace with this demand and have available today three major types of equipment which are recommended, dependent upon the problem of the paper mill in question. Mr. Becker discussed in detail these machines, mainly the slot screen, the Centrifiner and the recently introduced pressure separators, such as the Purifiner and Vortrap machine. He also distributed diagrams of the Bird Purifiner and Centrifiner and explained the differences in these types of equipment.

Mr. Becker stated that it is impossible to make general recommendations regarding the selection of the equipment to be used for a particular mill. They examine, analyze and classify the dirt to be removed from the stock, and they require one or more types of equipment to improve the dirt condition.

Mr. Becker reviewed the principle of the slot screen which takes into consideration only the difference in particle size. The average slot size in present use on medium grades is .010 inch. However, some mills require even finer—as fine as .007 inch. Greater efficiency on such screens has been obtained by reducing the amount of stock passing through the screen thereby improving the cleanliness of the resultant paper. The Centrifiner and the pressure separators, such as the Vortrap and Pruifiner, rely on the difference in specific gravity between the fibers and the dirt to be removed. The Purifiner machine, however, subjects the stock to considerably high pressures which magnify the specific gravity differential of the dirt and fibers and it is because of this principle that it has opened up a new approach to the problem of dirt removal.

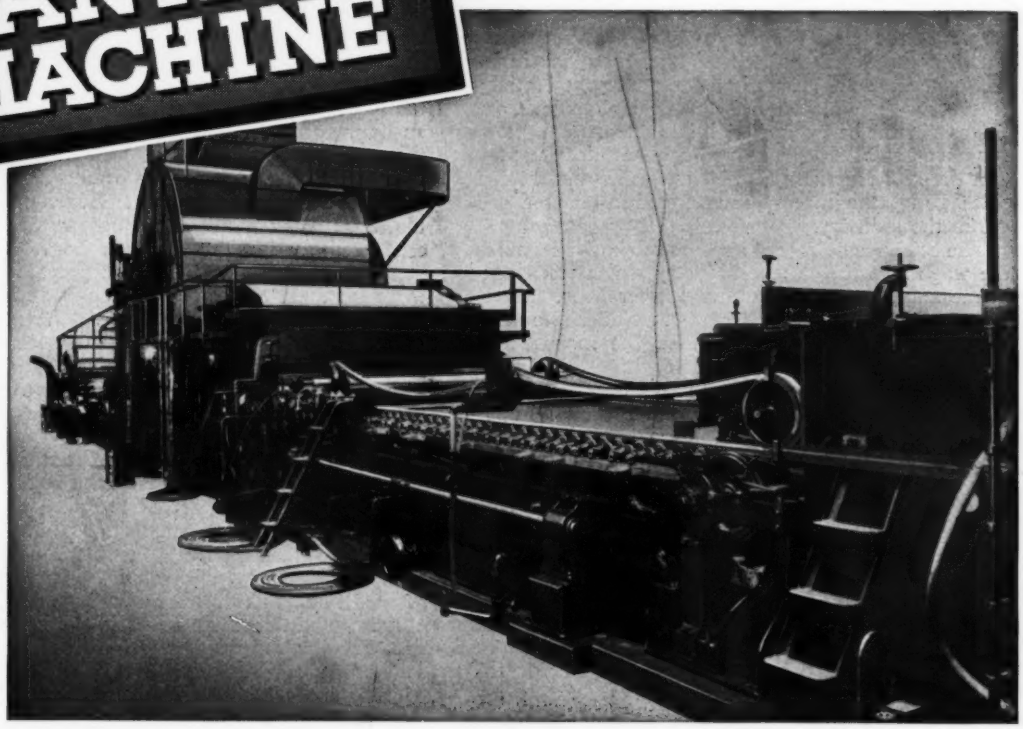
As a result of a survey of thirty mills, including all grades of paper, there has been a general effort to reduce the amount of dirt in the finished paper and this has resulted in the installation of considerably more screening apparatus than would have been considered some years ago.

The New England Section of TAPPI and the Connecticut Valley Superintendents Association are very appreciative and indebted to their members from Berkshire County who sponsored this meeting and contributed to its success.

Those present included:

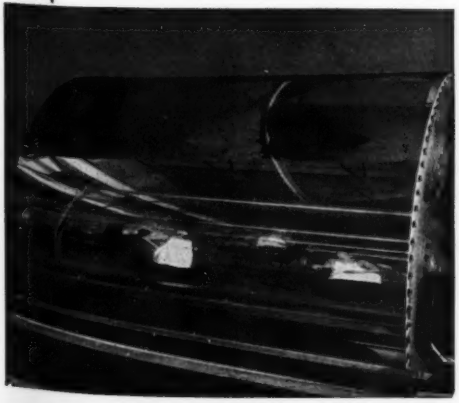
F. M. Gillespie, Claude Smith, W. D. Murray, Mr. and Mrs. A. F. Cosby, W. G. Russell, Howard Ferguson, J. T. Leecock and Helen U. Kiely, American Writing Paper Corporation, Holyoke, Mass.
Mr. and Mrs. C. B. Brown and Jack Harrington, American Tissue Mills, Holyoke, Mass.
Norman Alper, M. S. Alper & Son, Inc., Providence, R. I.
F. D. White, Mr. and Mrs. E. J. Veron, George W. Veron, Jr., Joseph K. Pearson, Mr. and Mrs. Harold Rice and George W. Veron, Brightwater Paper Company, Adams, Mass.
F. K. Becker, Bird Machine Company, E. Walpole, Mass.
M. O. Morris and Mrs. Morris, Case Brothers, Inc., Highland Park, Conn.
Cornelius Stapley, Chemical Paper Company, Holyoke, Mass.
James F. Fitzgerald, Collins Manufacturing Company, Wilbraham, Mass.
Russell S. Slocum, C. P. Slocum and Paul Donaghy, Corn Products Sales Company, South Boston, Mass.
E. R. Granger, Chromium Corporation, Waterbury, Conn.
Paul B. Fowler and Frank Johnson, Crocker-McElwain Company, Holyoke, Mass.
C. C. Decker, William Glendon, D. C. Knight, John M. McGarry, Charles Manning, L. B. Tucker, L. E. Richards, F. H. Williams, C. L. Rigabar, Mr. and Mrs. Hagar and E. O. Reed, Crane & Co., Inc., Dalton, Mass.
A. F. Bailey, DuPont Company, Providence, R. I.
A. M. Altieri, R. H. Doughty and R. J. Proctor, Fitchburg Paper Company, Fitchburg, Mass.
W. J. Burke, General Dyestuff Corporation, Providence, R I.
R. J. Hemphill, General Electric Company, Pittsfield, Mass.
Ralph Carter, Highland Knit Company, Springfield, Mass.
Mr. and Mrs. F. H. Schneider, Hampden Color and Chemical Company, Springfield, Mass.
A. P. Kraus, Holyoke Fiber Box Company, Holyoke, Mass.
Thomas L. Stirling, Hercules Powder Company, Holyoke, Mass.
W. D. Stroud, F. C. Huyck & Son, Albany, N. Y.
B. J. Mayo, Jr., Imperial Paper and Color Corporation, Boston, Mass.
Charles B. Muzzy and A. A. Bush, E. D. Jones & Son, Pittsfield, Mass
A. L. Perry and Al Cardwell, Krebs Pigment Company, Boston, Mass.
H. E. Duston, Monsanto Chemical Company, Boston, Mass.
Herbert Hobday and Howard S. Stewart, Mountain Mill Corporation, Lee, Mass.
Mr. and Mrs. Robert Mannheim, Mathieson Alkali Works, Providence, R. I.
Mr. and Mrs. E. N. Wennberg, Moore & Thompson, Bellows Falls, Vt.
Charles Champion, Frances Champion, Millers Falls Paper Company, Millers Falls, Mass.
Mr. and Mrs. J. F. Wright, National Aniline and Chemical Company, Boston, Mass.
Mr. and Mrs. L. E. Weiser, National Aniline and Chemical Company, New Haven, Conn.
B. R. Neice and C. E. Quirk, New York Color and Chemical Company, Belleville, N. J.
J. J. O'Brien, *The Paper Mill*, Boston, Mass.
Mr. and Mrs. L. W. Crouse, Penick & Ford, New York City.
T. C. Brown and Harold Soderbaum, Parsons Paper Company, Holyoke, Mass.
Mr. and Mrs. O. W. Messner, Robertson Paper Box Company, Montville, Conn.
Joseph J. Thomas, Rohm & Haas Co., Inc., Philadelphia, Pa.
H. J. Norton, W. E. Doverin, R. H. Dempsey, C. F. Young and Archie Sharkey, Rising Paper Company, Housatonic, Mass.
P. S. Sinclair, The Sinclair Company, Holyoke, Mass.
Walter Trotman, C. H. Smith Corporation, W. Springfield, Mass.
William F. Powers, P. W. Ayres, Thomas E. Boyne, J. J. Powers, Franklin T. Kelly and A. M. Gair, Smith Paper, Inc., Lee, Mass.
R. D. McCarron, Stein, Hall & Co., Inc., New York City.
Mr. and Mrs. Harold Bolles, Mr. and Mrs. Tom Parkhill and Mr. and Mrs. L. W. Shattuck, Strathmore Paper Company, Woronoco, Mass.
Arthur L. Hobday, Southworth Paper Company, W. Springfield, Mass.
Kenneth Bolton, Titanium Pigment Company, Boston, Mass.
Mr. and Mrs. K. P. Coachman, Taylor Instrument Companies, Rochester, N. Y.
Mr. and Mrs. F. L. Barstow, U S. Rubber Company, Springfield, Mass.
Albert Disney, C. J. Valentine Company, New York City.
Charles Horton, R. T. Vanderbilt Company, New York City.
C. L. Reece, Whiting Paper Company, Holyoke, Mass.
L. D. Frisbie, Westfield River Paper Company, Russell, Mass.
Mr. and Mrs. Bradford West, Bradford West Company, Pittsfield, Mass.
G. W. Craigie.
B. Newell.
W. P. Morris and Mrs. Morris, Belchertown, Mass.
George Congden, Chatham, N. Y.

THE Beloit YANKEE MACHINE



● **The Beloit Yankee Machine furnishes an economical easy means of diversification. No other machine has the all-around adaptability to fit the needs of mills making specialty papers, both light and heavy weights.**

The machine is provided with all the latest features: Removable Fourdrinier ...High Speed Super Shake...Suction Rolls...High Pressure Dryer...Hypoid Drive, etc.



Beloit has developed a special alloy metal and special grinding and polishing process to produce the close grained, hard mirror finish shown in this photograph. This is a result of Beloit's many years of experience in building practically all the Yankee machines in this country.

Beloit has also recently developed a high pressure Yankee dryer to meet the demand for maximum production.

THE BELOIT WAY IS THE MODERN WAY

BELOIT IRON WORKS • BELOIT • WIS.

MINIMUM WAGES UNDER WALSH-HEALEY ACT

(Continued from page 15)

filed by the American Paper and Pulp Association in behalf of the industry. This brief alleged that the definition of the industry as contained in the Board's recommendations was too restrictive; that the industry did and does have an apprenticeship, learner and handicapped worker problem and may wish to establish a need for a tolerance for such workers at a subsequent time; that the wage structure in the industry warrants the establishment of a central zone lying between the Northern and Southern regions in accordance with the grouping made under the National Recovery Administration; that the Pacific Coast States should be grouped with the Northern States for purposes of a minimum wage determination; and that the recommendations did not give sufficient consideration to the minimum wage paid to female workers in the industry.

The evidence of record appears to show adequately the wage structure in the industry which is engaged in the manufacture of pulp and other fiber, and the primary conversion of pulp and other fiber into paper and paperboard, and in addition, the manufacture and conversion of primary paper into toilet paper and paper towels, coated book paper and paper shipping sacks. It was alleged by the National Paperboard Association that the wage survey did not include the manufacture of certain paperboard items. The record shows, however, that the prevailing minimum wage in the manufacture of such paperboard is similar to that prevailing in the manufacture of paper and the paperboard covered by the survey.

For this reason and for the further reason that it is not possible to segregate properly by definition the paperboard products referred to by the National Paperboard Association, such products will be regarded as within the industry as defined for this determination. If the companies manufacturing any paperboard items not covered by the survey should in the future be deprived of Government contracts because of this wage determination, they will be given another opportunity to file complete information with the Department for further consideration.

The evidence of record indicates that there are approximately 125,000 production workers in the industry as defined. The survey covered approximately 90,000 such workers, or 80 per cent of the total employees in the industry. It appears that this survey adequately shows the wage structure existing in the industry.

Slightly over 27,000 workers are reported as receiving base rates. This number includes the employees of the industry receiving minimum wages and constitutes ample basis for finding the prevailing minimum wage in the industry.

A tabulation of the base rates shows appreciable wage differentials in different sections of the country. The Southern States show lower wage rates in general than the Northern States, while the highest rates are found in the far West.

In the Southern States, 4,423 workers are found at the base rates ranging from 25 to 52 cents an hour. The heaviest concentration is found at 40 cents an hour, but below this rate are found 54.4 per cent of the workers in these States receiving base rates. At 34, 35 and 36 cents an hour are found 629 workers or 14.2 per cent of the total base rate employees. This represents the central tendency of distribution, and the Board's recommendation that I find 35 cents an hour to be the prevailing minimum wage for the Southern States appears to be supported by the record. In the Northern States 20,023 employees are found at base rates ranging from 25 to 64 cents an hour. The outstanding concentration takes place at 40 cents an hour, and the Board has recommended that I find 40 cents an hour to be the prevailing minimum wage in the Northern States. It appears, however, that a considerable number of employees in the Northern States receive wages at 38 and 39 cents an hour and I find in this case that the midpoint of the three 1-cent intervals of 38, 39 and 40 cents represents the central tendency of the distribution.

In the States of California, Oregon, and Washington, 2651 workers are at the base rates and 21.9 per cent are found at 50 cents an hour. The Board's recommendation that I find the prevailing minimum wage for these States to be 50 cents an hour appears to be supported by the evidence.

The contention made by the American Paper and Pulp Association that I find a prevailing minimum wage for a central zone appears not to be substantiated by the evidence of record; the contention that the States of Washington, Oregon, and California should be included with the Northern States likewise appears to be not supported by the record.

Although no showing for the need of a tolerance for apprentices, superannuated, or handicapped workers has been made, if the need for a tolerance for such workers is established in the future, the matter of modifying this determination will be considered.

It is noted that there exists in the industry a practice whereby the employees of the industry for the sake of convenience pay, through the instrumentality of the employer's disbursing office, certain obligations. Whether or not such practice contravenes the provisions of Section 1(b) of the Act must be decided only upon full disclosure of all facts involved.

Where there exists at the plant of any bidder on Government contracts subject to the provisions of the Public Contracts Act a practice of so using its disbursing office for the convenience of its employees, and where this practice has been in existence at the plant for a long continued period of time, the bidder should submit a full statement of the facts to the Administrator, Division of Public Contracts, for a determination as to whether or not the practice contravenes the provisions of Section 1(b) of the Act.

I have examined the findings of the Board and the record of the hearing, together with the briefs filed, and in the light of the facts

I HEREBY DETERMINE

The minimum wage for employees engaged in the performance of contracts with agencies of the United States Government subject to the provisions of the Act of June 30, 1936 (49 Stat. 2036; 41 U. S. C. Sup. III 35), for the manufacture or furnishing of pulp and other fiber and the primary conversion of pulp and other fiber into paper and paperboard, and in addition, the manufacture and conversion of primary paper into toilet paper and paper towels, coated book paper and paper shipping sacks, to be the amount indicated for each of the following groups of States as noted above.

REICHHOLD

SYNTHETIC RESINS

A BETTER WAY TO WAX-TREAT PAPER

The resin-wax treatment of paper is one of chemistry's most important contributions to the progress of paper makers.

A lower degree of permeability, much greater water resistance, and greater adhesion are a few of the advantages derived from the substitution of synthetic resin for paraffin. Moreover, certain synthetic resins are relatively tasteless, odorless, and nontoxic. As a result, they are finding a very wide acceptance in surface coatings for food containers, beverage cases, and drinking cups.

But resin-wax combinations are just one of many applications of synthetic resins in the paper industry. Reichhold's research staff has developed synthetic resins which yield clearer, paler overprint varnishes and lacquers and more efficient coatings. It is the continued work of this staff that maintains the superiority of Reichhold's complete line of synthetic resins, processed copals and ester gums.

Inquiries are invited concerning the use of Reichhold synthetic resins in the paper industry.

REICHHOLD CHEMICALS
INCORPORATED • DETROIT, MICHIGAN

Government Paper Bids and Awards

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., October 4, 1939—Whitaker Paper Company will furnish the Government Printing Office with 21,630 pounds (70,000 sheets) of 28 x 34 H. F. sulphite manila tag board at 4.82 cents. Stanford Paper Company will furnish 6,700 pounds (50,000 sheets) of 38 x 48 blue machine finish book paper at 8.95 cents and the same firm will also furnish 10,000 pounds of standard newsprint paper in 52¾ inch rolls at $37.50 per ton. Bids for all of these items were received on September 13.

Barton, Duer & Koch Paper Company will furnish 40,000 pounds of yellow sulphite writing paper in 32 inch rolls at 4.72 cents. Middlesex Products Corporation will furnish 25,000 sheets of 24 x 36 white cloth lined paper at $86 per M sheets less 2 per cent. Bids for these items were received on September 8.

Cauthorne Paper Company will furnish 17,302 pounds (82,000 sheets) of 44 x 56 buff sulphite writing paper at 4.96 cents. Consolidated Paper Company will furnish 271,400 pounds (152,000 sheets) of 21 x 27 hard rolled bonder's board at 4.82 cents. Barton, Duer & Koch Company will also furnish 19,175 pounds of 38 x 48, 100 per cent rag, white lithograph finish chart paper; 4,470 pounds same 38 x 53 and 52,725 pounds of 36 x 44 same, all at 15.33 cents. Bids for all of these items were received on September 1.

R. P. Andrews Paper Company will furnish 542 pounds (5,500 sheets) of 100 per cent rag, 18½ x 35½ white recording instrument chart paper at 18 cents. Mudge Paper Company will furnish 28,000 pounds of 22½ x 28½, 280 lbs., jute tag board and 10,000 pounds same 200 lbs., at 7.25 cents. Bids for these items were received on August 30.

For 18,700 pounds (200,000 sheets) of 32 x 42 yellow sulphite writing paper; Mathers-Lamm Paper Company, 7.2 cents; Mudge Paper Company, 7.1 cents; Aetna Paper Company, 9.31 cents; Marquette Paper Company, 6.25 cents; Barton, Duer & Koch Paper Company, 6.5 cents; and R. P. Andrews Paper Company, 7.94 cents.

For 44,400 pounds (150,000 sheets) of 24 x 38 H. F. sulphite manila tag board; Paper Corp. of U. S., 5.24 cents; Whitaker Paper Company, 5.78 cents; and R. P. Andrews Paper Company, 5.75 cents.

For 20,100 pounds (200,000 sheets) of 50 per cent rag, 21 x 32 white ledger paper; R. P. Andrews Paper Company, 11.63 cents; Stanford Paper Company, 11 cents; Whitaker Paper Company, 11 cents; Barton, Duer & Koch Paper Company, 9.75 cents; Graham Paper Company, 11.84 cents; Mudge Paper Company, 10.91 cents; Baxter Paper Company, 11.78 cents; Mathers-Lamm Paper Company, 15.69 cents; and Walker, Goulard Plehn Company, 11.3 cents.

For 7,269 pounds (46,000 sheets) of 34 x 55 M.F. book paper; Mudge Paper Company, 5.29 cents; R. P. Andrews Paper Company, 5.4 cents; Stanford Paper Company, 5.83 cents; and Graham Paper Company, 5.85 cents.

For 100,000 sheets of 22 x 35 white railroad board; Whitaker Paper Company, $27.10 and $26.29 per M sheets; Mudge Paper Company, $32.70; R. P. Andrews Paper Company, $26.26; Barton, Duer & Koch Paper Company, $25.76; Stanford Paper Company, $26.04; and Paper Corp. of U. S., $26.29.

For 10,000 pounds of 24 x 36 oiled manila tympan paper; Link Paper Company, 7.9 cents; Mudge Paper Company, 7.96 cents; Cromwell Paper Company, 7.75 cents; R. P. Andrews Paper Company, 7.75 cents; and Mathers-Lamm Paper Company, 7.75 cents.

Exports Discussed at SAPI Luncheon

The subject of discussion at Monday's luncheon of the Salesmen's Association of the paper industry held at the Hotel Lexington, New York on September 25, was the export situation. Several export managers attended and presented some conflicting views on the outlook, which made the discussion all the more interesting. On the one side it was argued that since 1914, a number of paper mills had been built in South America, and on some grades these countries were practically self-sufficient, also that the flood of inquiries recently received from South America probably represented a greatly exaggerated demand, because if any inquiry for a given tonnage is placed with several U. S. export houses and they in turn canvass a number of mills, the apparent demand may be multiplied several times. The difficulty of foreign exchange was also mentioned as a drawback to the development of a large export business. On the other side, the question was raised of how the South American countries were going to get the necessary tonnage of pulp to run their mills if Scandinavian shipments are wholly or partially cut off, and if English mills are forced to seek their pulp requirements in the North American market because German submarines are sinking their cargoes from Scandinavian countries and if a considerable scarcity of some grades of pulp develops in the United States. The experience of the previous World War was cited as evidence that a large export demand would come into our market, if the European war lasts very long. It was also suggested that our State Department would also be active in fostering trade with the South American countries. C. W. Boyce, executive secretary of the American Paper and Pulp Association, concluded the discussion with a brief statement in which he pointed out that the paper mills had ample capacity to take care of all requirements, but there was a real danger that the flood of orders now being received would result in over production and the building up of large stocks in the hands of distributors and convertors at rising prices, to be followed by the inevitable slump, thereby duplicating the unfortunate experience of 1937. He also repeated the advice given by Clark Everest at the National Paper Trade Convention in Chicago that paper manufacturers should meet the new situations caused by the European war in such a way that they can "unwind" with the least possible damage to themselves when the war ends.

General Chemical Buys Kalamazoo Plant

KALAMAZOO, Mich., September 25, 1939—The General Chemical Company, a subsidiary of the Allied Chemical Company, has purchased from the Henderson Ames Company what was formerly their Number two plant, consisting of several buildings, the largest a two-story brick 120 x 59 feet. The land plot is approximately 350 x 275 feet on a railroad siding.

Remodeling and installation of equipment for the establishment of a paper maker's chemical plant to serve the mills in this area, will be started at once.

Years of Experience

in serving the exacting color requirements of the paper industry have placed Du Pont Brilliant Crocein FL in a commanding position. The outstanding qualities are many.

It is the fastest-to-light soluble aniline red used on paper.
has greater affinity for paper
an other acid colors and gives
ly clear backwaters even in
p shades.
en used in high concentra-
it causes practically no
m.
It produces negligible two-sidedness—in pink boards the top side is hardly distinguishable from the wire side of the sheet.

Du Pont Brilliant Crocein FL is especially suitable for light pink to deep scarlet shades on bond, cover, wrapping or any paper where fastness-to-light and non-two-sidedness are prime requisites.

DU PONT DYESTUFFS

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E. I. DU PONT DE NEMOURS & COMPANY, INC.

ORGANIC CHEMICALS DEPARTMENT, DYESTUFFS DIVISION, WILMINGTON, DELAWARE, U. S. A.

Southern Pulpwood Men Meet

The second meeting of the Group One members of the Southern Pulpwood Conservation Association took place on September 9 at Franklin, Va. The business session followed an excellent dinner at "The Shack" outside of Franklin at which the Chesapeake-Camp Corporation was host.

The meeting, to which were invited members of the State Forest Services and representatives of various railroads, was devoted primarily to discussion of forest fire protection. E. A. Sterling, chairman of Group One, explained that forest fire protection was of vital importance to a large number of industries in addition to those which depended entirely on the forests for their raw materials. He explained that this was particularly true as regards the railroads which have since the earliest days of our country been dependent on forest products as a large percentage of their total car loadings.

F. C. Pederson, state forester of Virginia, and W. C. McCormick, assistant state forester of North Carolina in charge of fire protection, explained in detail their respective programs of fire protection. After discussing the methods being pursued in these states both gave accounts of the problems limiting their progress in the organization of additional fire protection units. The point stressed most of all was that public apathy is no longer a limiting factor in fire protection in the states of Virginia and North Carolina, this factor now being a lack of sufficient funds.

A resolution was passed whereby members of Group One made known their intention of pursuing a vigorous course of action in both Virginia and North Carolina to acquaint the governors and general assemblies with the great need for additional funds to provide for statewide fire protection. The representatives of the five railroads present similarly declared their intention of following the action of the pulpmills.

Heads Paper Group in Boston

Raymond B. Nichols, assistant treasurer and credit manager of Storrs & Bement Company, 282 Congress Street, Boston, has accepted the chairmanship of the Paper group, in the Greater Boston Annual Maintenance Appeal, of the Salvation Army, as announced by John E. Wilson chairman of the Industry and Finance Division, of the campaign. Mr. Nichols is active gathering sub-chairmen and co-workers so that this group will "beat all records" in the campaign, which will start early in October. He is married and lives at 249 Weston Road, Wellesley, Mass. Mr. Nichols is a stamp collector, keen about photography and golf.

W. H. Ward Dies in Accident

KALAMAZOO, Mich., September 28, 1939—W. H. Ward for the past fourteen years western Michigan sales representative for Bermingham & Prosser Company, died in a Detroit hospital after he plunged five stories down a freight elevator shaft in a Detroit building. He was in the employ of the Graham Paper Company, St. Louis and the Bradford Paper Company of Kalamazoo previous to his association with the Bermingham & Prosser Company.

Paper Mill Official Given Testimonial

[FROM OUR REGULAR CORRESPONDENT]

LAWRENCE, Mass., October 2, 1939—Joseph J. Levis, general manager of the Munroe Paper Corporation, of this city, was feted Thursday evening September 21 by many friends, business associates and relatives at a testimonial dinner held in honor of his coming marriage to Miss Mary A. Paulekas, October 8.

The guest of honor is a well known local business man and is actively affiliated with the Andover Country club, Lawrence Order of Elks, Lawrence Kiwanis and the St. Patrick's Holy Name society.

Following a catered turkey dinner by A. P. Weigel, co-chairman Stephen Shumsky introduced the toastmaster of the evening, Edward J. Wolfendale. Assisting Mr. Shumsky with arrangements for the testimonial was John J. Barry.

The toastmaster called upon the following speakers for remarks: Mayor Walter A. Griffin, Representative William Casey, Senator Thomas J. Lane, Alderman Daniel F. Ferris, Louis J. Scanlon, V. R. Hann of New York city, Atty. Donald Hurley of Boston, Robert Graham of Boston, H. A. Myers, Joseph Thornton, Representative Cornelius J. Twomey, John J. Cahill and John E. Conlon.

Telegrams of congratulation messages were read from Joseph C. Campbell, treasurer of the Industrial Paper and Cordage Company of Pawtucket, R. I., Whitney Paper Company of Boston, Stimpson Company of Boston and William Butler of Springfield.

During the speaking program, Mr. Levis was presented with a special gift from the Hinds & Coon Company of Boston and a purse of money by the toastmaster in behalf of the large gathering. The honored guest responded fitting to the occasion and thanked all those present for the honor accorded him.

J. C. Dabney Made Sales Manager

Harris-Seybold-Potter Company, of Cleveland, Ohio, announces the appointment of John C. Dabney as sales manager of its Seybold Division. The Seybold factory, located at Dayton, Ohio, manufactures Seybold Precision Paper Cutters, Seybold-Morrison Wire Stitchers, Seybold-Wright Drilling Machines, and kindred equipment such as die presses, book compressors and knife grinders, used mainly in the printing, paper producing and converting, packaging and shipping, and sheet steel fabricating industries.

William Kinzeler, formerly Seybold Sales Manager, becomes manager of the Central Sales District, with headquarters at Dayton. Glenn Baber is named assistant sales manager. John R. Lehman remains as resident manager of the Dayton factory.

Following his graduation from the Harvard School of Business Administration, Mr. Dabney joined the marketing organization of the Standard Oil Company of Ohio, with whom he spent a number of years in business research and sales management work. For, several years he was Retail Sales Manager for the company's largest division. More recently, Mr. Dabney has been Vice-President and Sales Manager of a company engaged in the manufacture and distribution of structural steel and steel specialty products. He joined the Harris-Seybold-Potter Company in May of this year as manager of Sales Research and Promotion.

S. R. Bradly Retires

On September 1, S. R. Bradly, formerly general superintendent of the A. M. Collins Manufacturing Company, Philadelphia, Pa., retired, after fifty-seven years of continuous employment with the company.

Mr. Bradly celebrated his seventy-fifth birthday last March. He was one of the pioneers in the development of coated cover papers and, in his association with Henry H. Collins and his two sons, Henry H. and Alfred M. Collins, helped to develop many of the features of coated papers as they are known today. He came to the Collins Company as a boy and worked through all the various departments. When he first came here, most of the coating was done in sheets. Pasting was also done in sheets, even the very heavy calipers. At about this time, roll coating was introduced, roll pasting, and, also, the use of casein in the coating of paper. Coincident with the introduction of the Multi-tone coating machine came the development of the famous Collins' multi-tone book and cover papers and, later, the use of roll embossing, which produced the various fancy cover papers, now so common for advertising and printing purposes.

Mr. Bradly's knowledge of paper was unrivaled, and he was frequently called upon by other mills for information and opinion. During his time, the Collins Company grew from what was a very small plant, making mostly heavy-weight blanks and boards, to its present size. To him goes not a little of the credit for the reputation of the Collins Company. His unfailing kindness and thoughtfulness to the other employees has gone far to make the Collins Company what it is and help build up the spirit which still prevails. The personal troubles of any employee were always his, and his advice and help were often sought.

He retired, temporarily, in 1932 but was called back almost immediately and rendered magnificent service at a time when it was sorely needed. No one at the A. M. Collins Manufacturing Company will ever forget Mr. Bradly's services during the trying years of the late depression. He leaves with the best wishes of a host of friends, both at the plant and in the trade. Everyone hopes he will enjoy his well-earned rest.

Cellulose Firms Face Charges

The Federal Trade Commission last week accused a group of manufacturers of transparent cellulose sheeting products of a price-fixing conspiracy.

The commission's complaint said the concerns control more than 90 per cent of the country's output and sale of such products.

The commission named the following respondents: National Converters Institute, Chicago, the trade association; Shellmar Products Company, Chicago; Milprint Products Corporation, Milwaukee, with branches in Philadelphia and Los Angeles; Traver Paper and Manufacturing Company, Chicago.

Also Dobeckmum Company, Cleveland; Dennison Manufacturing Company, Framingham, Mass.; Caton Printing Company, Kansas City, Mo.; Thomas M. Royal and Company, Philadelphia; Nashua Gummed and Coated Paper Company, Nashua, N. H., and Pioneer Wrapper and Printing Company, Los Angeles.

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CONSTRUCTION NEWS

A Summary of Vital Facts Regarding Construction, Financing and Operation of Pulp and Paper Mills

General Construction News

Glens Falls, N. Y.—The Veldown Company, Inc., because of increasing sales of its tissues, and due also to its policy of expansion, is now installing a new Yankee Machine for the manufacture of toilet and cleansing tissues. This machine will double the company's present output and enable it to meet its orders promptly. The concern figures that it will take about three months to install this and will provide employment for approximately 50 men.

St. Louis, Mo.—The Mississippi Valley Paper Company, 2100 Washington avenue, commercial and other paper stocks, has approved plans for new one and two-story storage and distributing building at 3412 Market street, totaling about 40,000 square feet of floor space. It is estimated to cost close to $75,000, with equipment. General contract for erection has been awarded to the Austin Company, 16112 Euclid avenue, Cleveland, Ohio, and Arcade Building, St. Louis. Work will be placed under way at once.

Charleston, S. C.—The West Virginia Pulp and Paper Company has completed plans for new addition to mill near North Charleston, to be 26 x 58 feet, and 65 feet, equipped as an evaporator unit. Work will be placed under way at once, using company forces for this purpose. An award for structural steel framing has been let to the Frank M. Weaver Company, Lansdale, Pa. An evaporator unit will be furnished by the Swenson Evaporator Company, Harvey, Ill., and condenser by the Goslin-Birmingham Manufacturing Company, Birmingham, Ala. Cost estimated close to $100,000, with machinery. C. R. Wadleigh is company engineer, in charge. Main offices are at 230 Park avenue, New York, N. Y.

East Walpole, Mass.—Bird & Son, Inc., manufacturer of wall board and other paper board products, special paper stocks, etc., has completed plans for new one-story addition to local mill on Washington street extension, to be used for storage and distributing service. It is reported to cost about $50,000, with equipment. Bids have been asked on general contract and erection is scheduled to begin soon. S. H. Kay is company engineer in charge.

Fernandina, Fla.—Rayonier, Inc., 343 Sansome street, San Francisco, Cal., is pushing work on completion of new branch mill at Fernandina, in course of erection for a number of months past, as previously noted in these columns, and is scheduling operations to begin at the mill early in December, when it is expected to give employment to about 400 persons. Plant will be given over to the production of wood dissolving pulp for use in manufacture of rayon, cellophane and kindred materials, and will have a rated output of about 180 tons per day. It is proposed to reach this production at the mill early in 1940. Plant will represent an ultimate cost of close to $6,000,000. General erection is being carried out by the Rust Engineering Company, Clark Building, Pittsburgh, Pa.

Williamstown, Mass.—The Gevaert Company of America, Inc., 523 West 55th street, New York, N. Y., importer and distributor of Belgian-made papers and films, is arranging for the establishment of a mill in the United States for production of such paper stocks, under the process used in Belgium, and has acquired mill property at Williamstown for this purpose. Buildings will be remodeled and improved at early date, and equipped installed for sizable output. It is expected to have the plant ready for production early next year.

Lawrence, Mass.—Donald Franks, Lawrence, commercial paper goods, has taken over a floor in Building No. 8 of the former local Everett Mill properties, and will occupy for a storage and distributing plant, providing facilities for large capacity.

Lockland, Ohio—The Philip Carey Manufacturing Company, Lockland, Cincinnati, manufacturer of roofing papers, insulating papers, and kindred stocks, plans rebuilding of portion of its subsidiary mill at Hosea street and South Cooper avenue, recently damaged by fire, with loss estimated at close to $75,000, including equipment.

Holyoke, Mass.—That the New England Pulp and Paper Corporation, newly organized, is contemplating setting up a new plant for the de-inking of printed waste paper in this area, possibly Holyoke, has been generally heard about the city. No confirmation of the rather definite report could be procured although a number of industrialists admitted knowledge of the plan. The organization of the new corporation is made up of a group of Massachusetts business men for the purpose of establishing the plant to produce the pulp under what has been classified as the McGregor system.

Stockton, Calif.—The Fibreboard Products, Inc., Russ Building, San Francisco, Calif., manufacturer of paper board products, straw board, etc., has completed plans for new addition to branch mill at Stockton, to be one-story, reported to cost close to $50,000, with equipment. Bids have been asked on general erection contract and work will be placed in progress at early date. Leland S.

Rosener, 233 Sansome street, San Francisco, is engineer. As recently noted in these columns, company also has expansion under way at branch plant at Antioch, Calif., where work has been started on a new one-story unit, 80 x 370 feet, to be used for storage and distributing service. It is reported to cost about $90,000, with equipment. K. E. Parker Company, 135 South Park street, San Francisco, has the general erection contract. The same engineer mentioned prepared plans for structure.

Everett, Wash.—The Soundview Pulp Company, manufacturer of bleached sulphite pulp, is advancing production schedule at local mill and is now operating on a maximum basis of about 13,000 tons per month, as compared with a monthly average of about 7660 tons, a few months ago. It is expected to hold to capacity schedule for an indefinite period and with this increase it is estimated that by the close of this year, the gross output will exceed 113,000 tons for the past twelve months, as compared with a production of 69,774 tons in 1938.

Chicopee, Mass.—The National Transparent Box Company, McKinstry avenue, recently organized, plans operation of local plant for the manufacture of a line of special paper boxes and containers. Herman White, Chicopee, is president and treasurer.

Housatonic, Mass.—The Rising Paper Company, manufacturer of writing paper stocks, has awarded general erection contract to Ernest F. Carlson, Inc., 1694 Main street, Springfield, Mass., for proposed new addition to mill, recently referred to in these columns. It will be two-story type, estimated to cost close to $45,000, with equipment. Work is scheduled to begin at once.

Cleveland, Ohio—The Cleveland Corrugated Box Company, 7275 Wentworth avenue, manufacturer of corrugated boxes and containers, plans one-story addition to plant, including alterations and improvements in present building. Cost reported close to $45,000, with equipment. Bids will be asked soon on general contract. Edward G. Hoefler, 5005 Euclid avenue, Cleveland, is engineer. A. R. Havighurst is president.

Rockingham, N. C.—The Southern Tissue Mills, Inc., organized several months ago, has regular production under way at new local mill, comprising the former textile mill property of the Midway Textile Mill Company, as previously reported in these columns. Plant will be given over to the manufacture of paper napkins, paper towels and kindred tissue products. Employment will be given to about 50 persons for present operations. D. E. Leland is general manager.

Bathurst, N. B.—The Bathurst Power and Paper Company, Ltd., Sun Life Building, Montreal, Que., manufacturer of newsprint, box board and other paper products, has plans maturing for new addition to mill at Bathurst, consisting of a main one and multi-story unit, with auxiliary structures. It will be used for increased capacity. Bids are scheduled to be asked soon on general erection contract. Cost estimated close to $500,000, including equipment.

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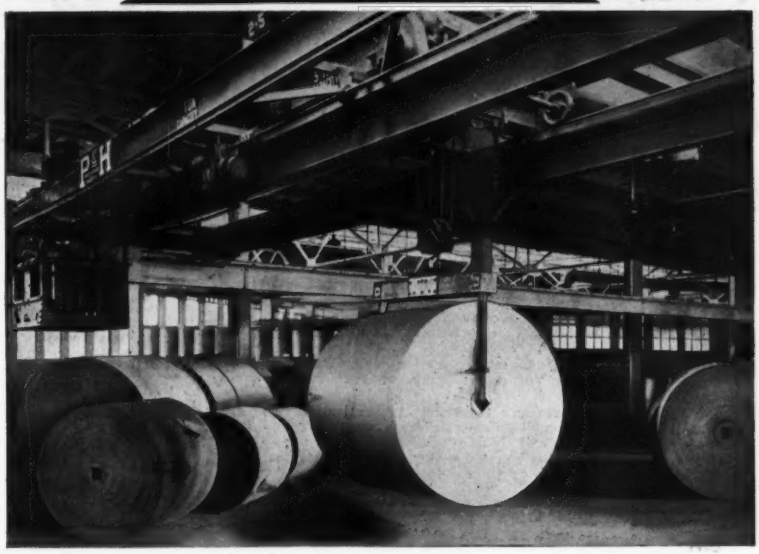

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PAPER TRADE JOURNAL

Title Reg. U. S. Pat. Off.

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EDITOR

Ronald G. Macdonald
Editor Technical Section

Lynne M. Lamm
Washington Correspondent

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COMING EVENTS IN PAPER INDUSTRY

NEW ENGLAND SECTION. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

DELAWARE VALLEY SECTION. Technical Association of the Pulp and Paper Industry—Second Friday of each month at the Engineers Club, Philadelphia, Pa.

LAKE STATES SECTION. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

KALAMAZOO VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

NATIONAL SAFETY COUNCIL, PAPER AND PULP SECTION, Annual Meeting, Atlantic City, N. J. October 16-20.

BUSINESS AND LABOR

With the index of general business activity now over 100 and the highest since the first week in October 1937, two aspects of the business situation are attracting considerable discussion. One phase is concerned with the fear of a boom with its inevitable repercussions. The other factor is labor and what is regarded as an impending storm over the Wage Law and the National Labor Relations Board.

The expansion in industrial activity is expected by some economists to advance the Federal Reserve Board index to around 115 in December, or about 15 points higher than last August. It is because of this rapid upswing and fear of uncontrolled speculative activity that many industrial leaders, bankers, and economists advise that government and business should jointly endeavor to establish this improvement on a permanent basis and thus avoid more serious slackening of business later on. One encouraging aspect of the current domestic situation is the expectation of a large-scale industrial advance based entirely upon domestic conditions. This factor includes credit resources, new housing program, re-equipment of plants and heavier consumer buying in the durable goods field, including the railroads.

The decline in industrial activity abroad under the critical conditions now prevailing there, has vigorously stimulated the lagging domestic demands for a wide variety of goods. Most of this activity since the first of September is attributed to the psychological effect created by the uncertain political and economical situation in Europe, and little has as yet been contributed by actual orders for goods essential for nations which have diverted so large a part of their man power from normal industrial employment. Although the tangible influence of hostilities abroad has been small, it has been responsible for plans of rather extensive purchases of equipment by the railroads. This effect has come at an opportune time when, according to the National Conference Board, inventories of raw materials were at the lowest level in six years.

It seems clear that the moderate development of business under the normal expansion of domestic needs has been overshadowed by the events which have occurred in Europe this month. While the sharp rise in stock and commodity prices and declining bond prices is due in most part to the crisis in Europe, steady improvement in industry and trade was in progress during last summer and the outbreak of hostilities abroad has served to accelerate the advance. There can be no convincing argument made to support the false assumption that a conflict is ultimately profitable to any nation's prosperity, though temporary gains for neutral nations may result from it. The policy of American industry in this respect has been well stated by the National Association of Manufacturers. "American industry wants peace. Peace is the life blood of progress. Peace must be the national objective. Europe's problems do affect us, but our domestic problems still must come first. If yesterday industry was the only source of prosperity and reemployment, today it is as well the keystone of preparedness and peace. Under any conditions, America must depend on a smoothly functioning, efficient industrial system. Manufacturers will not relax their efforts to achieve and maintain sound improvement in our domestic economy. As manufacturers we recognize it to be our responsibility and moral obligation to conduct our businesses so that the prices of the products we produce and sell are related equitably to production costs. The present situation calls for agreement on common objectives, but the democratic process of consultation and criticism must never be abandoned. Otherwise, we shall be following in the footsteps of those who believe in government by coercion. In a world distraught by force the best way to preserve representative democracy is to practice it."

With rising payrolls and employment the danger to industrial production arising from jurisdictional labor disputes is the cause of serious concern by the government. Although it has been announced that the present special session of Congress will be entirely devoted to neutrality legislation, there is a section of labor anxious to take up new legislation designed to protect labor. This legislation is desired because of the anticipated boom in industry and labor's desire to share in the profits by an upward revision of the minimum wage feature of the present law. The first act of the House committee investigating the National Labor Relations Board was made by forwarding 60,000 questionnaires to employers and union organizations. More than 100 questions have been asked by the committee and, according to its Chairman, Representative

Howard Smith, of Virginia, the questionnaires cover the entire relationship of the NLRB to employers and unions.

Among the questions asked were the following: "Did the trial examiner direct the reporter to omit from the record any part of the proceedings? Did he examine or cross-examine your witnesses. Or witnesses for NLRB? If so, to what extent? Please furnish also whatever information you can on the attitude and conduct of the attorneys for NLRB before and during the hearing; the attitude and conduct of the trial examiner before and during the hearing and the cost of the hearing to your company as well as the effect, if any, the results had upon your community."

For the purpose of advancing a policy in favor of repeal of the wage and hour law the Committee on Manufacture of the Chamber of Commerce of the United States, put forward five proposals for amendments to the Wagner Labor Relations Act as follows: "To assure to employers the right to petition the Board in representation cases. To guarantee freedom of speech. To repeal the closed-shop proviso. To provide proper segregation of the Board's functions as investigator, prosecutor, and judge. To restrict the right of the Board to inaugurate unfair labor practices proceedings to cases in which it finds such proceedings will be in the public interest."

B. C. Mills Expect To Benefit

VANCOUVER, B. C., September 30, 1939—Vancouver B. C. British Columbia mills producing kraft paper are expected to benefit from rising prices for this commodity as a result of conditions. Pacific Mills, Ltd., big Ocean Falls pulp organization, and Canadian subsidiary of the Crown Zellerbach Corporation, is the chief producer of kraft in British Columbia, and at present supplies markets as far distant as South Africa and South America.

In the east the price of paper bags, largely manufactured from kraft, has already advanced, but so far, according to Vancouver bag makers, there has been no change in price locally. But the fact that under normal conditions huge supplies of kraft are imported from Europe, and that the war has seriously interfered with this movement is regarded as an indication of higher prices in the future.

Importers of pulp seem to agree that increased freight and insurance will raise the cost of bringing the material to the United States by about $6.00 per ton. However, quotations have been withdrawn and all distress pulp which was offered on the market at low prices has disappeared.

Curtis Co. Elects Officers

The Curtis Paper Company, Newark, Del., has reorganized following the death of Herbert Warren Mason, head of the company since 1926 and who died last August. The following officers have been elected: president, Charles M. Levis; vice-president, Irwin F. Megargee; treasurer and secretary, Mrs. Mildred Noyes Mason.

Production Ratio Report

These statistics are based upon paper production reports to the American Paper and Pulp Association:

COMPARATIVE MONTHLY SUMMARIES[1]

Months	1939	1938	1937	1936	1935	1934
January	77.5%	63.9%	90.3%	76.1%	65.8%	.....
February	81.7%	68.7%	90.1%	77.9%	70.0%	.....
March	84.0%	69.6%	90.3%	76.0%	70.5%	.....
April	82.9%	68.3%	92.1%	82.3%	70.0%	.....
May	80.2%	69.0%	90.6%	81.6%	69.4%	.....
June	79.7%	66.0%	87.3%	80.7%	72.3%	.....
July	75.2%	72.0%	81.8%	77.3%	64.9%	.....
August	83.0%	77.2%	82.9%	81.5%	70.9%	.....
September	.....	76.3%	78.6%	80.5%	71.9%	58.2%
October	.....	82.5%	73.5%	87.6%	75.6%	64.7%
November	.....	79.6%	61.9%	88.0%	75.3%	61.7%
December	.....	74.4%	54.5%	85.9%	71.2%	59.6%
Year Average	.....	72.3%	80.6%	81.3%	70.5%	.....
First 38 weeks	81.0%	69.9%	87.1%	79.3%	69.3%	.....

COMPARATIVE WEEKLY SUMMARIES[1]

CURRENT WEEKS, 1939		CORRESPONDING WEEKS, 1938	
August 19	82.9%	August 20	78.0%
August 26	83.4%	August 27	80.1%
September 2	85.2%	September 3	77.5%
September 9	73.9%	September 10	66.0%
September 16	92.2%	September 17	79.6%
September 23	93.5%	September 24	78.4%

The following statistics show the number of mills reporting by ratio groups:

	Number of Mills Reporting—Current Weeks					
Ratio Limits	Aug. 19, 1939	Aug. 26, 1939	Sept. 2, 1939	Sept. 9, 1939	Sept. 16, 1939	Sept. 23, 1939
0% to 50%	67	69	60	59	45	25
51% to 100%	236	232	242	234	246	184
Total Mills Reporting	303	301	302	293	291	209

PAPERBOARD OPERATING RATIOS

Per cents of operation based on "Inch-Hours" reported to the National Paperboard Association:

Year	Jan.	Feb.	Mar.	Apr.	May	June	July
1935	62%	68%	68%	63%	61%	66%	62%
1936	62%	67%	67%	70%	69%	70%	69%
1937	80%	86%	86%	88%	85%	77%	66%
1938	54%	60%	61%	57%	58%	56%	57%
1939	60%	67%	71%	69%	64%	67%	63%

Year	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1935	67%	71%	77%	71%	61%	66%
1936	75%	78%	82%	80%	74%	72%
1937	74%	69%	65%	55%	45%	73%
1938	66%	66%	70%	65%	59%	61%
1939	72%	....	....	....	....	....

Week end. Aug. 19, 1939—72%
Week end. Aug. 26, 1939—72%
Week end. Sept. 2, 1939—73%
Week end. Sept. 9, 1939—63%
Week end. Sept. 16, 1939—79%
Week end. Sept. 23, 1939—80%

[1] Production-capacity ratios are based upon six-day capacity ratings which are adjusted periodically to correspond with the ratings reported by individual companies. Ratios are subject to revision until all reports are received.

Delaware TAPPI to Hear Sanborn

J. R. Sanborn, in charge of paper sanitation research at the New York State Agricultural Experiment Station, will give a talk before the Delaware Valley Section of TAPPI on October 13 at the Engineers Club in Philadelphia. The title of Dr. Sanborn's paper is "Microbiological Problems Affecting Mill Operation and Production." In this talk Dr. Sanborn will cover the developments in slime control, the investigation of complaints related to biological conditions, bacteriological standards for checking the control of undesirable microorganisms, the significance of microbiology in the manufacture of paper and paper board for personal, household and food uses, and the microbiological survey as a means of detecting sources of contamination and as a guide to elimination of contamination.

The meeting will be preceded by dinner, which will be served at 6:30 P.M.

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ZINC SULFIDE PIGMENTS IN PAPE

Section of the
Technical Association of the Pulp and Paper Industry

Edited by Ronald G. Macdonald, Secretary

Review Of Paper Industry Literature

Copies of United States Patents can be obtained from the United States Patent Office, Washington, D. C., for 10 cents each. Send currency, not stamps.

Paper Specialties

Method of Enhancing the Wet Strength of Paper. Milton O. Schur, assignor to Brown Company. U. S. pat. 2,116,544 (May 10, 1938.)—Impregnation of paper with aqueous albuminous material such as glue is followed by drying, and the dried impregnated paper containing only a small amount of the impregnating binder is exposed momentarily to a temperature of about 205 to 345 deg. C. in the presence of an insolubilizing agent for the albuminous binder, such as formaldehyde. (Cl. 91-70)—A.P.-C.

Reinforced Paper. Thomas L. Shepherd. U. S. pat. 2,116,289 (May 3, 1938).—In the production of elastic multi-ply sheets in which lines or other open pattern of rubber (preferably an aqueous dispersion of latex) is applied between the plies, the rubber is printed on to the web by means of an engraved roll, the size of the grooves being so proportioned in relation to the viscosity of the rubber composition that exactly the required amount of mixture is transferred to the web without any excess to blur the lines. (Cl. 91-50)—A.P.-C.

Laminated Sheet Material Including Chlorinated Rubber. Charles V. Brady, assignor to Bemis Brothers Bag Company. U. S. pat. 2,106,867 (Feb. 1, 1938.—A material suitable for packaging various substances comprises a layer of loose weave fabric such as burlap to which a layer of paper is attached by an adhesive such as a latex composition, the opposite face of the paper carrying a film of chlorinated rubber solution capable of yielding to an extent sufficient to adhere to the paper even when the latter is stretched. (Cl. 154-50)—A.P.-C.

Surface Treatment of Paper or Cardboard. I. G. Farbenindustrie A.-G. Brit. pat. 480,679 (Feb. 24, 1938).—Paper or cardboard is treated with an aqueous solution of a water-soluble cellulose ether or an aqueous alkaline solution of a water-insoluble cellulose ether. Suitable water-soluble ethers are cellulose glycol ethers and the ethers obtainable by the reaction of alkali cellulose with ethane chlorosulphonate or chloroacetic acid. Suitable water-insoluble but alkali-soluble ethers are the water-insoluble methyl-celluloses. The solutions may contain also a loading agent, such as kaolin or lithopone. Starch also may be included. When alkaline solution are used, the paper or cardboard may be after-treated with an acidic reagent such as a solution of aluminum sulphate or steam containing an acid vapor. The products are useful for writing and printing purposes.—A.P.-C.

Coated Paper Suitable for Printing. Samuel S. Himmell. U. S. pat. 2,119,164 (May 31, 1938).—A light-permeable paper is provided on each side with a coating of a clay type, the weight of which is about 8 to 13 lb. per ream, 50, 25 x 38, the paper used having underlying imprinted white markings formed with a white pigment such as titanium dioxide and a smaller amount of aluminum powder, so proportioned that the imprinted markings are substantially invisible by reflected light and visible by transmitted light. (Cl. 91-68)—A.P.-C.

Impregnated Material. Herman C. Burmeister, assignor to General Electric Company. U. S. pat. 2,112,732 (March 29, 1938).—In order to obtain a strong pliable insulating material of high dielectric strength, a fibrous sheet material is coated and partly impregnated with an insoluble and infusible resin resulting from a heat and pressure treatment of a viscous composition consisting essentially of a solvent, composed of benzene and alcohol, and an aromatic amine-aldehyde condensation product polymerized in the said solvent to such an extent that the resulting composition has a viscosity of at least 4 deg. Engler at 20 deg. C., the innermost fibers of the fibrous material being substantially free from the resin. (Cl. 154-2.6)—A.P.-C.

Paper Backing. Minnesota Mining and Manufacturing Company, assignees of R. G. Drew. Brit. pat. 482,815 (June 27, 1936).—Porous and absorbent paper is impregnated with aqueous glue solution (e.g., of 17 per cent concentration) containing glycerine, and dried under such conditions of temperature and relative humidity that the paper retains some of its porosity. One side of the paper is then treated with a more concentrated (30 per cent) glue solution which, after drying, is hardened with formaldehyde.—A.P.-C.

Rot-Proofing Paper. Nat. Processes, Ltd., and W. J. Carter. Brit. pat. 484,576 (Nov. 5, 1936).—Fibrous materials are rot-proofed and sized by simultaneous treatment with a water-insoluble rot-proofing agent consisting of a metallic (aluminum, zinc) salt or an ester of naphthenic acid, or mixtures of such salts and (or) esters, dispersed in an aqueous vehicle which will not coagulate

the sizing liquid, and a sizing composition, preferably using a composite liquid consisting of a stable aqueous dispersion of the rotproofing and sizing agents (e.g., a rosin-wax size). If desired, the materials may be rot-proofed with a stable aqueous dispersion of the rot-proofing reagent prior to the sizing operation.—A.P.-C.

Manufacture of Sheets or Absorbent Paper or Paper Boards. W. F. Williams, assignee of Société Anonyme F. Dobler. Brit. pat. 483,766 (Jan. 26, 1937).—Paper (or board) which has been sized with resin or pectic substances is passed through a bath of warm aqueous sodium hydroxide or carbonate (e.g., of 2% concentration), pressed, and dried. Paper so treated becomes very absorbent. —A.P.-C.

Manufacture of Glass-Filled Paper. N. V. Maats. tot Beheer en Exploit. van Octrooien. Brit. pat. 483,769 (Feb. 12, 1937).—Glass fibers are incorporated in the paper while it is in the process of forming on the fourdrinier wire. The glass fibers are made *in situ* by extrusion in the molten state through fine jets, the fibers being forced on to the paper by a blast of air or steam.—A.P.-C.

Waterproofing Cellulosic Materials. Reginald J. W. Reynolds, Eric E. Walker and Imperial Chemical Industries, Ltd. Brit. pat. 481,099 (Feb. 28, 1938).—Paper and other cellulosic materials are rendered water-repellent by treatment with an aldehyde and an amide of a higher fatty acid having at least 10 carbon atoms, or with a preformed reaction product of such an amino compound with an aldehyde, and subjecting the treated material, preferably in the presence of an acid substance as catalyst, to the action of dry heat.—A.P.-C.

Oil-Impregnated Fruit Wrap. Geo. W. Charters. U. S. pat. 2,114,701 (April 19, 1938).—Tissue paper for fruit wraps is creped, impregnated with a preservative oil to the extent of 15 to 17.5% of the weight of the paper, and given a light calendering (two or three nips). (Cl. 91-68)—A.P.-C.

Gummed Paper Product. Ferdinand W. Humphner, assignor to Mid-States Gummed Paper Company. U. S. pat. 2,125,241 (July 26, 1938).—Animal glue is caused to foam by thoroughly removing the grease therefrom or by incorporating chemicals (e.g., calcium citrate and sodium silicofluoride) to induce foaming; when the foam is well developed the glue liquor is passed over a hot drum to evaporate the moisture; the finely divided glue is then scraped off and further pulverized. A thin layer of adhesive (such as dextrine, starch or inferior glue, either alone or in admixture) is applied to one side of kraft paper. The powdered animal glue is sifted or dusted over the freshly gummed or moistened surface of the kraft paper and is embedded into the first layer by means of high pressure rolls which also impart a high glossy finish to the glue. (Cl. 91-68)—A.P.-C.

Apparatus for Treating Waxed Paper Webs. Adolph Potdevin, assignor to Potdevin Machine Company. U. S. pat. 2,115,283 (April 26, 1938).—The invention provides a machine for removing the wax from predetermined areas of a web of waxed paper, so as to permit of applying adhesive at these areas when the paper is to be used for making bags or is to be wound into a hollow tube. The web is passed over a roll that is provided with easily changeable electric heating elements which melt the wax on the areas from which it is desired to remove the wax; and the web then passes over a suitable wiping device which removes the melted wax. (Cl. 91-18)—A.P.-C.

Glassine, Greaseproof or Imitation Parchment Paper. Frank J. McAndrews and Lester Long, assignors to Charles McDowell. U. S. pat. 2,112,540 (March 29, 1938).—Glassine, greaseproof or imitation parchment paper containing modifying materials uniformly distributed throughout its entire cross-section is produced by pouring a quantity of glassine stock on the wire of a paper machine, causing an initial amount of the water to drain through the wire so as to deposit a partially formed nonself-sustaining wet web of paper on the wire, directing a solution containing the modifying materials in the form of a finely atomized spray against the upper surface of the web in the direction of movement of the web prior to the application of any substantial amount of suction thereto, and removing the water of the solution simultaneously with the water normally contained in the web. (Cl. 92-40)—A.P.-C.

Method of Making Washable Wall Paper. Charles G. Bright, assignor to Paper Patents Company. U. S. pat. 2,123,399 (July 12, 1938).—A paper is decorated while it is on the paper machine, partially dried, and then coated with a potentially water-insoluble protein (e.g., casein). The coated web is dried and the coating is fixed by treating with alum or formaldehyde. The coated web is softened and simultaneously embossed and printed upon with a water-insoluble ink. (Cl. 92-40)—A.P.-C.

Wrapping Paper. Geo. J. Brabender, assignor to Marathon Paper Mills Company. U. S. pat. 2,117,237 (May 10, 1938).—A wrapping paper which is treated with petroleum is rendered resistant to rancidification by the inclusion of 1 to 10 per cent of groundwood in the furnish. (Cl. 92-3)—A.P.-C.

Method and Apparatus for Drying Washable Wall Paper. Ross H. Buckwalter, assignor to Star Peerless Wall Paper Mills. U. S. pat. 2,133,424 (Oct. 18, 1938).—A continuously moving web, supported in a succession of overlapping folds on an endless belt, is subjected to the action of heated air, the web being turned over at periodic intervals to expose both sides to the heated air. The latter is directed so as to produce a floating or billowing action on the web, thereby accelerating the drying. (Cl. 34-48)—A.P.-C.

Wrapping Paper and Method of Making Same. Stewart Bohn, assignor to Rapinwax Paper Company. U. S. pat. 2,132,931 (Oct. 11, 1938).—Breadloaf wrappers are formed by coating extensive end portions of a paper sheet to provide rectilinear opaque areas spaced apart by an uncoated band, printing a design on the opaque portions and impregnating the sheet throughout with wax, thereby rendering the uncoated strip transparent. (Cl. 91-67.9)—A.P.-C.

Laminated Glassine Paper. Cornelius M. Connor, assignor to The Glassine Paper Company. U. S. pat. 2,128,739 (Aug. 30, 1938).—Glassine paper is laminated by the interposition of a film of a water-insoluble resin, wax and a plasticizer. (Cl. 154-46)—A.P.-C.

Tissue Face Towel. Alma D. Milliken. U. S. pat. 2,113,431 (April 5, 1938).—A device for removing cosmetic cream from the skin comprises a tissue paper towel having a large number of apertures resulting from the removal of portions of the towel. The apertures are adapted to pass cream from the active to the inactive surface of the towel, and their edges are roughened and raised from the plane of the active surface to provide a brush-like effect. (Cl. 92-68)—A.P.-C.

Backing Paper for Roll Coating Film. Paul C. Seel, assignor to Eastman Kodak Company. U. S. pat. 2,126,350 (Aug. 9, 1938).—The backing paper used in roll film is coated with a layer of a cellulose alkyl ether, such as cellulose ethyl ether having a high alkoxy content. (Cl. 95-9)—A.P.-C.

Waterproofing Compound. Maurice H. Belloc, assignor to Société Nobel Française. U. S. pat. 2,115,797 (May 3, 1938).—A liquid coating composition for waterproofing paper, etc., comprises a water-insoluble condensation product of polyvinyl alcohol with acetic paraldehyde, a mixture of formaldehyde and acetic paraldehyde or trioxymethylene, together with a minor proportion of paraffin, a natural wax or synthetic wax or chlorinated naphthalene (about 5 to 6 per cent of the amount of resinous condensation product) together with a solvent such as toluene and ethyl acetate or benzine, etc. (Cl. 134-13)—A.P.-C.

Decalcomania Paper. John MacLaurin. U. S. pat. 2,128,588 (Aug. 30, 1938).—The backing paper is colored, preferably with a direct dye. The adhesive coating is colored, preferably with dyestuffs similar to those used in the paper base. This results in easier control of the manufacture and of the use of the decalcomania. (Cl. 41-33)—A.P.-C.

Greaseproof Gummed Paper. Ferdinand W. Humphner, assignor to Mid-States Gummed Paper Company. U. S. pat. 2,126,192 (Aug. 9, 1938).—Paper suitable for ordinary gumming is coated on one side with a thin layer of an oil-resistant lacquer. Adhesive containing a reactive solvent (preferably water-soluble) is next applied to the lacquer surface, preferably as soon as possible after the lacquer has dried. (Cl. 91-68).—A.P.-C.

Mold Resisting Remoistening Tape. Ferdinand W. Humphner, assignor to Mid-States Gummed Paper Company. U. S. pat. 2,133,028, (Oct. 11, 1938).—Paper tape is coated on one side with gum or other suitable adhesive and on the other with silicate of soda. (Cl. 91-68).—A.P.-C.

Composite Abrasive Sheet. Albert L. Ball, assignor to The Carborundum Company. U. S. pat. 2,129,661 (Sept. 13, 1938).—A web of loose or open woven textile fabric (e.g., knitted cotton or cheese cloth) is fed on to a paper machine wire, and a layer of pulp is delivered on to the fabric. After leaving the wire the combined fabric and pulp layer is dried and calendered, and used as backing for abrasive particles in known manner. (Cl. 51-185).—A.P.-C.

Flameproof and (or) Water and Moisture Resistant Paper. Virginia B. Goodwin and Wm. H. Pashley. U. S. pat. 2,128,296 (Aug. 30, 1938).—Paper is impregnated under pressure with an aqueous solution of borax, sodium phosphate, ammonium phosphate, ammonium sulphate, gelatin and glycerine. The treated paper is dried, impregnated under pressure with a solution of latex, partially dried, and then treated to vulcanize the latex. (Cl. 91-68).—A.P.-C.

Paper Making. Horace A. DuBois, assignor to Paper Patents Company. U. S. pat. 2,132,016 (Oct. 4, 1938).—A very thin, fireproof, creped, cellulosic sheet suitable for use in making wadding is produced by forming a suitable web on a Yankee paper machine, impregnating it while it is on the drier but still moist by applying a solution of fireproofing salts directly to the outer surface of the sheet, drying the impregnated web, and finally removing it from the surface of the drying cylinder by means of a creping doctor. (Cl. 92-69).—A.P.-C.

Washcloth, Dishcloth and the Like. Harold H. Jones, assignor to Kalamazoo Vegetable Parchment Company. U. S. pat. 2,112,963 (April 5, 1938).—A sheet of creped parchmentized paper has a number of perforations spaced to permit the free passage of water there through when the sheet is crumpled together for used as a dishcloth, washcloth, etc. (Cl. 15-208).—A.P.-C.

Monsanto Chemical Co. Joins TAPPI

The Monsanto Chemical Company has become a member of the Technical Association of the Pulp and Paper Industry. Its Merrimac Division, in particular, has long been identified with the paper industry.

Merrimac Chemical Company was founded in 1853 by Robert B. Eaton of Woburn, to supply the limited chemical requirements of the infant textile industry of New England. Its start was characteristic of its growth. As New England industry grew and the number of chemicals needed in the fabrication of its diversified products mounted, Merrimac Chemical Company kept pace with this increasing demand for chemicals.

In 1917 Merrimac merged with the Cochrane Chemical Company of Everett, Massachusetts. Since then Merrimac has been the largest manufacturer of industrial chemicals in New England.

Merrimac has been closely identified with the paper industry ever since 1886, the year it first produced paper maker's alum. Other products for the paper industry have been added since, notably sodium aluminate, ammonia, salt cake and lacquer.

Supplementing the gradual growth which built its product list from two or three chemicals in 1853 to more than fifty, Merrimac has made several major moves in its history. One of these in 1925, was the purchase of the Anderson Chemical Company of New Jersey. Through this purchase the company became the manufacturer of an extensive line of solvents, lacquers and nitrocellulose solutions. In 1929, the Monsanto Chemical Company of St. Louis purchased all the assets of Merrimac Chemical Company. This greatly extended Merrimac's sphere of activity and augmented the all-important research and development facilities without which a modern industry may not hope to prosper. Shortly after this merger the company, which had been operating two plants at Woburn and Everett, practically rebuilt the Everett plant and concentrated all of its manufacturing in that city.

The company will be represented by A. L. Pratt.

A Method for the Measurement of the Angle of Contact Formed Between A Liquid Surface and A Fiber, and the Application of This and Swelling Data to Pore Diameter Measurements*

By James E. Foote [1]

Abstract

The effective pore diameter of the capillary system contained in a sheet of paper is important in studying the penetration of liquids into a sheet. A measure of the pore diameter can be obtained by means of the Lucas equation:

$$D = 4\eta k/\omega,$$

where D = pore diameter,
η = viscosity of the liquid,
ω = surface tension of the liquid, and
k = constant.

The value of k *can be determined by studying the rate of capillary rise of a liquid in a strip of paper.*

This equation does not, however, take into consideration the swelling action of the liquid and the angle of contact formed between the liquid and the fiber. By application of these factors the accuracy of the method should be improved.

Two strongly swelling liquids (formamide and water) and two which dissolved rosin readily (alcohol and benzene) were used. The second two were used so that determinations on rosin-sized sheets could be made. The quantitative swelling data for water, formamide, and alcohol were taken from the work of Kress and Bialkowsky.

To measure the angle of contact a microprojection method in which individual fibers were dipped into a liquid surface was developed.

It was found that on the application of the swelling and contact angle data the results obtained by the Lucas equation could be rationalized. The effect of the swelling and the contact angle was clearly shown.

Alcohol appeared to give the most correct value. The angle of contact is zero and the short time required to complete a determination reduces the swelling effect to a negligible factor. Alcohol can be used on rosin sized and non-rosin sized samples with equal success.

Some very interesting facts were found in the contact angle studies. Quite extensive data indicate that alcohol always formed a zero angle of contact. This condition also prevails on more limited data for formamide and benzene. Water, on the other hand, gave values greater than zero. The angle is increased by impurities in the stock, rosin sizing, and certain surface sizing materials.

An increase in the TAPPI size test is concomitant with an increase in the angle of contact.

* Presented at the Fall Meeting of the Technical Association of the Pulp and Paper Industry, Syracuse, N. Y., September 12 to 14, 1939.
A portion of a thesis submitted in partial fulfillment of the requirements of The Institute of Paper Chemistry for the degree of Doctor of Philosophy from Lawrence College, Appleton, Wis., June, 1936.

[1] Munising Paper Company, Munising, Mich.

In studying the penetration of liquids into a sheet of paper, it is necessary to visualize paper not as a solid mass, but rather as a porous body made up of a solid component and a complex capillary system. It is by means of the capillary system that the penetration of liquids into a sheet of paper can take place. The rate and amount of penetration, when other conditions, i.e., liquid, temperature, etc., are held constant, is dependent upon the effective pore diameter of this capillary system. In the following paper a method is outlined by means of which the pore diameter of a sheet of paper can be measured. The value of such a measurement is apparent when one considers that the effectiveness of such operations as coating, printing, tub sizing and, in fact, any operation where a liquid phase is applied to a sheet of paper is directly dependent upon correct penetration.

Of special interest and importance is the receptivity of coating raw stock in the recently perfected methods of rapid paper-machine coating. Experience in this field has taught that an exact adjustment must be made between the receptivity of the raw stock and the composition and nature of the coating color. Under the comparatively inflexible mechanical conditions existing in the high speed coating operation it is observed that a control of the characteristics of the raw stock must be given appropriate consideration. Among the factors governing the coatability of a given raw stock, certainly the sizing and the effective and total pore diameter must be of great importance.

In defining exactly what is meant by a pore, reference will be made to the work of Baird and Hrubesky *(1)*. These workers, in studying a sheet of paper from strictly fundamental concepts, considered that a sheet could be thought of as consisting primarily of a solid volume and of an air volume. Computation of solid volume in the sense of Baird and Hrubesky is relatively simple. From the percentage by weight and the specific gravity of each of the solid components, i.e., the cellulose fibers, the ash, sizing (rosin and surface), and absorbed moisture, the solid volume is readily calculated. Determination of the air volume is more complicated. A value for this quantity is derived by subtracting the solid volume from the total volume occupied by the sheet. The total volume is obtained from dimensional measurements. It is this fraction which is related to the effectiveness of penetration.

On further consideration of the air volume Baird and Hrubesky divided it into three parts: (1) a pore volume, (2) a recess volume, and (3) a void volume. In relation to these concepts a *pore* was defined as a

passage connecting the two surfaces of the sheet, a *recess* as an opening which is connected to one surface only, and a *void* as a volume which is in no manner connected to either surface. Methods are suggested by means of which the volume occupied by each of these can be measured.

That pore passages through the sheet do exist is well known, and a relative measurement involving their size and number can be obtained by means of a densometer reading.

The existence of recesses, as defined above, has been shown by Bekk (*2*) in his measurements of the horizontal porosity of paper.

The existence of voids in papers made from relatively free stocks is questionable. Such a condition might exist in a sheet made from highly over beaten stocks, but in most sheets the occurrence of absolute voids must be infrequent, and the volume occupied by them of minor importance.

From this fundamental picture it is clear that the parts of the air volume which affect penetration are the so-called pore volume and the recess volume. Since the voids, if they exist, are in no way connected to the surface, there is no way in which the liquid can penetrate into them, and thus they are without effect. Considered from his viewpoint it would appear that, in general, the pores should affect the depth of penetration and the recesses should govern the spread.

Passages do exist which take more or less direct routes through the sheet, whereas other passages run more or less parallel to the surfaces. Between these two extremes there exist passages of all degrees of orientation. Moreover, these passages are not straight or uniform; they form a maze of criss-crossing, interlocking, crooked, and non-uniform channels. Passages which lead more or less directly through the sheet are connected with those running more or less parallel to the surface. These in turn are connected to others of varying orientation.

In such a complicated system it would be hard in most cases to determine exactly where a pore, as defined above, stopped and a recess started. Furthermore, since each part of the air volume governs penetration, any study of penetration must include analysis of the effects of both the pores and the recesses.

To simplify matters somewhat, it may be assumed that any passage which is connected to the surface in any manner may be classed as a pore, and henceforth in this work the term *pore* will be used in this sense.

One must also remember that any experimentally obtained value for pore diameter must necessarily be an effective value. This need not, however, detract from the importance of such a figure. It is, after all, the effective value which governs the rate of penetration. Other things being equal, a sheet of a large effective pore diameter will permit more rapid penetration than one of a small effective pore diameter.

To measure this effective pore diameter the fundamental laws of capillarity can be applied. This was first done by Lucas (*7*) who, starting with the Poiseuille equation, derived mathematically an expression for the pore diameter. The present method is based on the work of Lucas.

The Lucas Equation

When a strip of paper is dipped into liquid which will wet the paper fibers, a capillary rise in the paper strip results. In studying this effect Ostwald (*8*) found that the relation between height of rise and time could be expressed by the empirical equation:

$$h^{1/n} = kt, \qquad (1)$$

where n is equal to the slope of the log-log curve of height of rise plotted against time, and k is a constant varying with the paper sample used.

Lucas, in further work on this subject, derived mathematically from the Poiseuille equation, the expression:

$$h^2 = (r\omega t)/2\eta \qquad (2)$$

for the height of rise, in which

r = radius of pore,
ω = surface tension of the liquid,
η = viscosity, and
t = time.

In equation (2) the time of rise to a certain height is shown to be proportional to the square of the height. The work of Ostwald, however, showed that this could be more accurately expressed by equation (1). Substituting equation (1) in (2) and solving for pore diameter, the following equation results:

$$D = (4\eta k)/\omega\ . \qquad (3)$$

In this equation the pore diameter, D, is expressed in terms of the viscosity, η, and the surface tension, ω, of the liquid, and a constant k which can be determined by study of the rate of capillary rise of the liquid up a strip of paper. This is the equation as developed by Lucas. In his extensive work with various liquids on three grades of filter paper he found values of n in equation (1) ranging from 0.460 to 0.50. Later work carried out by Simmonds (*10*) using water and cartridge paper gave a value for n of 0.425.

Critical examination of the Lucas equation reveals that, in its application to the study of the pore diameter of a sheet of paper, two conditions are encountered which would lead to erroneous results. The first of these is the property possessed by the cellulose fiber to swell when wetted by certain liquids. This swelling of the fiber will definitely alter the size of the effective pore diameter. Work by Kress and Bialkowsky (*6*) showed that the magnitude of the swelling varies with the liquid used. Thus, it would be expected that, if pore diameter measurements were made on identical samples first with a liquid which swelled cellulose strongly, and second with a non swelling liquid, different results would be obtained. One would expect a smaller value from the strongly swelling liquid. Therefore, in the application of the Lucas equation the magnitude of the swelling action of the cellulose fiber by the liquid must be accurately known if correct values are to be obtained.

The second objection to the Lucas equation is encountered in the surface tension factor. In the capillary rise of the liquid in a strip of paper, the force causing the ascension is the surface tension of the liquid. It is assumed in the equation that the fibers are perfectly wet by the liquid, i.e., that the angle of contact between the fiber and the liquid is zero. In such a case the entire component of the force is directed towards causing the ascension. This condition is not necessarily true. Cases exist in which the fibers are not perfectly wet and an angle other than zero exists. In such cases the factor of surface tension should be multiplied by the cosine of the angle formed between the fiber and the liquid in order to give a true value of the force causing the ascension. Thus, if the effective pore diameter was determined on identical samples with two different liquids, one of which wets the fibers perfectly, and the other which wets the fibers only partially, a larger value

would be obtained by the use of the first liquid than by the second.

Therefore, before the Lucas equation can be safely applied these two factors must be considered. For the sake of clearness these factors will be considered first and the data thus obtained will be applied to pore diameter measurements.

Swelling of Cellulose by Various Liquids

The importance of knowing accurately the extent of swelling caused by various liquids in relation to the determination of pore diameters has already been pointed out. A quantitative measure of this action can be obtained by the application of a dilatometer developed by Posnjak (*9*) and first used by him to measure the swelling of rubber when treated with various liquids. This was utilized by Kress and Bialkowsky (*6*) as a quantitative measure of the swelling power of several liquids. In the present investigation water, formamide, alcohol, and benzene were used. The first two were selected because of their strong swelling power, and the second two because of their ability to dissolve rosin. In the work of Kress and Bialkowsky the swelling action of water, formamide, and alcohol is given. They showed that not only the amount but also the rate of swelling varies with the liquid being used. Their curves for water, formamide, and alcohol are reproduced in Fig. 1.

The quantitative data at maximum swelling taken from these curves are as follows: formamide 125, water 90, and alcohol 40 per cent, respectively.

It is to be noted that the rates of swelling of formamide and water are nearly the same, and that the initial action is very rapid. For alcohol, on the other hand, the rate of swelling is much slower and maximum swelling is obtained only after several hours.

Thus, from the viewpoint of swelling effect, it would appear that on the same sample the apparent size of pores indicated by the three liquids should follow the series: formamide, water, and alcohol, with the smallest value for formamide. This assumes,

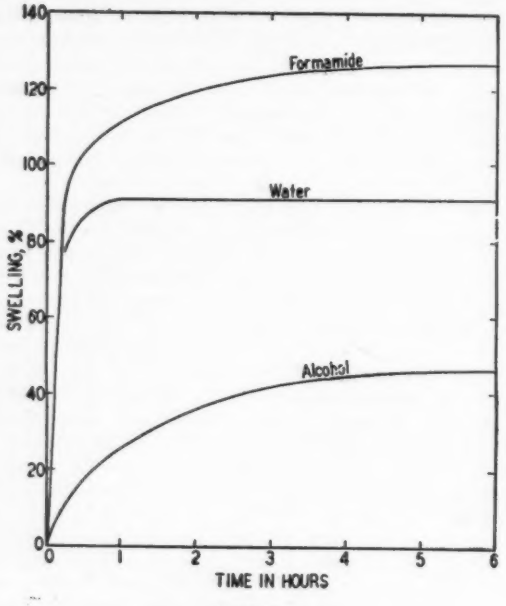

FIG. 1.
Swelling of Cellulose by Water, Formamide, and Alcohol

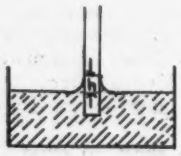

FIG. 2.

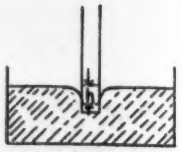

FIG. 3.

FIG. 2.—Contact Angle for Wetting Liquid. FIG. 3.—Contact Angle for Non-Wetting Liquid

of course, that the contact angles are the same in all cases.

The magnitude of the effect of swelling on the pore diameters will be about the same for formamide and water and will be large due to the rapidity of the action. For alcohol, on the other hand, the effect will be much smaller and, if the tests are carried out in a short time, the effect will be even further decreased owing to the gradual rate of swelling. The effect of benzene is an unknown quantity and will be discussed later.

This discussion shows that it would seem to be impossible to obtain accurate pore diameter values by using either water or formamide. Alcohol, however, offers an excellent opportunity for such measurements.

Contact Angle

The angle of contact formed between the fiber and the liquid is the second unevaluated quantity in the Lucas equation. Since the surface tension is the force pulling the liquid up the capillaries, only that component of the force acting parallel to the walls of the capillaries will be effective. This component is expressed as the product of the surface tension of the liquid, the distance of contact, and the cosine of the angle of contact. As this angle changes, the force causing the ascension of the liquid changes.

The concept of contact angle is illustrated in Figs. 2 and 3. These figures show two conditions that can result when a plate, such as glass, is dipped into two different liquids. The difference is essentially one of wettability. Fig. 2 represents a clean glass plate dipped in water. The plate is immediately wetted and, if it has been properly cleaned, the angle of contact is zero. The condition shown in Fig. 3 would result if the plate were dipped in a nonwetting liquid such as mercury. In this case there is no wetting and the angle approaches 180 deg.

Similar phenomena can be obtained with the same liquid if the nature of the material is changed. Such a condition occurs when cellulose fibers are rosin sized. Nonsized fibers are readily wetted by water and, in the ideal case, have a zero angle of contact. As these fibers are treated with rosin size the angle increases until, in the limiting case where the fibers have been rendered completely waterproof, an angle approaching 180 degrees results. This describes the state of affairs at the two extremes. Depending upon the conditions, angles varying in magnitude from 0 to 180 degrees can be obtained.

From a theoretical standpoint the height to which the liquid will be drawn, as in Fig. 2, or depressed, as in Fig. 3, is a function of the surface tension and the density of the liquid, the angle of contact and, in the case of narrow plates, the linear distance of contact. Therefore, if individual cellulose fibers were dipped into a liquid and the increase in the level of the liquid surface were measured, the increase in level should be a measure of the angle of contact

formed between the liquid and the fiber. It is on this concept that the present method for the measurement of contact angle is based.

Among other methods developed for the measurement of this angle in the case of paper products is that of Cobb (*3*). Her method consists essentially in placing drops of the liquid on the material to be tested with subsequent projection of the resultant image. A line tangent at the point of contact is then drawn. This gives the angle of contact. Such a procedure is illustrated in Fig. 4. In this method it is quite difficult to determine accurately the exact slope of the curve, and for this reason the method is open to personal error. Also, as the liquid or the vapor from the liquid penetrates into the material the angle changes. The angle obtained, therefore, is dependent upon the length of time that the liquid is in contact with the paper. Various angles can be obtained by varying the time of contact. This method has been reviewed recently by Codwise *(4)*.

Another method, reported by Kovalevski (*5*), uses a procedure similar to the one developed by Cobb. A strip of paper is suspended horizontally in a water bath and a drop of benzene placed on its bottom side. The image of this drop is then projected and the angle measured by drawing tangents at the point of contact. Kovalevski found that as the size test of a sheet increased, the angle of contact between the wet paper and the benzene decreased. This method is also subject to the objections raised against the Cobb method.

Theoretical Discussion

The present method, as stated previously, is based on the fact that the height to which a liquid will be raised on a surface by capillarity is a function of the density and the surface tension of the liquid, the angle of contact and, in the case of narrow plates, the distance of linear contact.

The height of rise when the angle of contact is not zero can be obtained from the equation:

$$1 - \sin\theta = g\frac{(\rho - \rho_0)}{\omega} \times \frac{h^2}{2}, \qquad (4)$$

where θ = angle of contact,
h = maximum height,
g = gravitational constant,
ρ = density of the liquid,
ρ_0 = density of air, and
ω = surface tension of liquid.

In the present investigation individual cellulose fibers were dipped in a liquid and the increase in the level of the surface was measured. Since these fibers are very narrow ribbons, the end effects and the width of the fiber must be considered. To express such a condition mathematically presents a very difficult problem. At the present time all that can be said is that the height of rise is a funcion of the surface tension and the density of the liquid, the contact angle, and the width and breadth of the fiber.

In the following, a method will be described by means of which individual fibers can be dipped in a liquid, and the height of rise of the liquid surface

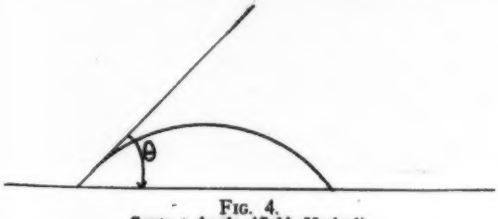

Fig. 4.
Contact Angle (Cobb Method)

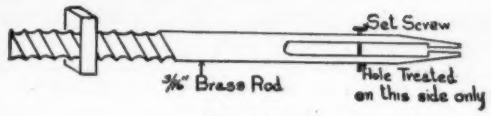

Fig. 6.
Fiber Holder

and the width of the fiber can be measured accurately. Since the surface tension and the density of the liquid are constant, it would appear that, if the height of rise was divided by the width of the fiber, the resultant quotient should be a measure of the contact angle.

Apparatus

The general problem of the measurement of contact angle by the method used in this work may be subdivided into three main phases: (1) To obtain individual fibers and to devise some means by which they can be securely held and lowered into a liquid; (2) to magnify the width of the fibers and the height of rise to a size where they can be accurately measured; and (3) to obtain a liquid surface whose height can be accurately and conveniently controlled.

The essential parts of the apparatus used are shown in Fig. 5.

1. *Fibers and Fiber Holder.* When a sheet of paper or pulp is torn, individual fibers are exposed in the frayed edge. It was found that these fibers could be easily removed by means of a special pair of tweezers, constructed in much the same manner as a drawing pen. Figure 6 shows their construction in detail.

2. *Magnification and Measurements.* To obtain magnification a Bausch and Lomb microprojector was used. In this setup there is included a light source, a set of focusable condensing lenses, a water heat filter, a stage, and a microscope (*See* Fig. 5). In the microscope a 16-mm. objective and a 7.5X-eyepiece were used. The magnification obtained on the drawing board was 520X.

3. *The Liquid Surface.* The problem of obtaining a correct liquid surface presented some difficulty. Two types of surfaces had to be prepared: one for angles less than 90 degrees and one for those greater than 90 degrees. Figs. 7 and 8 show the types of surfaces needed.

Since nearly all of the angles measured were smaller than 90 degrees, this condition will be considered first.

In order that the measurement could be made in a saturated vapor of the liquid being used, it was necessary to enclose the surface in a glass cell. This cell was constructed from microscopic slide glass. Care was taken to insure that the faces were parallel. A hole in the top admitted the tweezers and a hole in the bottom a glass tube on the end of which was

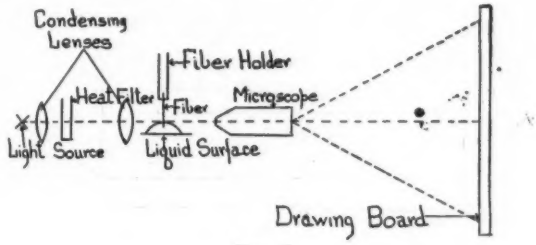

Fig. 5.
Apparatus for Measuring Contact Angle

formed a glass platform. This cell, with its dimensional measurements, is shown in Fig. 9.

The cell was cemented into a wooden frame which could be clamped to the stage of the microprojector. Attached to the frame was a support for the tweezers. This setup is shown in Fig. 10.

The tweezers were held in position by placing the nut in the slot cut in the top movable part. This portion was made movable to facilitate the centering of the fiber.

This arrangement proved very satisfactory and was used in all measurements of angles smaller than 90 degrees.

In the application of this cell it was found that the liquid surface could be raised and lowered much more conveniently than the fiber. To accomplish this the glass tube leading from the platform was connected to a reservoir which, in turn, was connected to another reservoir. These reservoirs were clamped to ring stands so that they could be raised or lowered readily. An approximate level was obtained by means of the first reservoir while the final adjustments were made by admitting or removing the liquid by means of the second. By this arrangement the rate and height of ascension or descension of the liquid surface could be very accurately controlled.

When a volatile liquid, such as alcohol, was used,

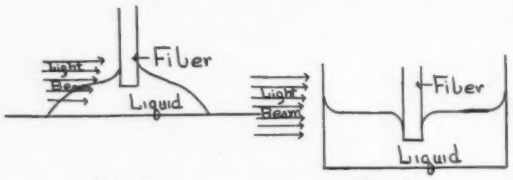

FIG. 7. FIG. 8.

FIG. 7.—Surface Needed for Angle Smaller Than 90 Degs. FIG. 8.—Surface Needed for Angle Greater Than 90 Degs.

the evaporation from the surface was sufficient to cause a gradual lowering of the surface. This effect was compensated for by means of the reservoir.

Certain minor difficulties were encountered. It was found necessary to ground the entire apparatus including the tweezers and the liquid. The glass cell and the tweezers formed a crude electroscope; whenever a charged body, such as the hand, was brought near the tweezers the liquid surface would be noticeably raised; hence, the necessity for grounding the apparatus.

When working with water, the vapor would con-

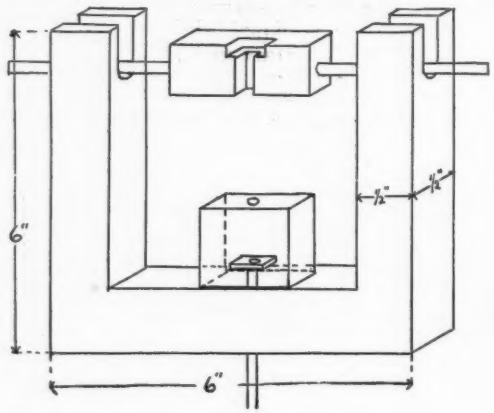

FIG. 10.
Cell Assembly

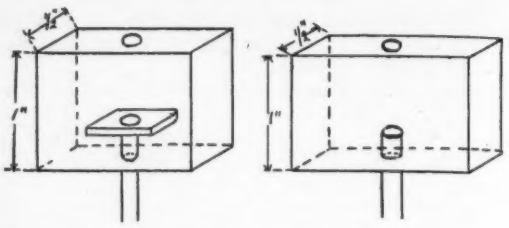

FIG. 9. FIG. 11.

FIG. 9.—Cell for Angles Smaller Than 90 Degs. FIG. 11.—Cell for Angles Greater Than 90 Degs.

dense on the faces of the cell and obscure the image. To overcome this difficulty a small heating unit was built to fit around the cell. This was operated from a 6-volt storage battery. The heating wires were held away from the faces of the cell by wooden blocks. The small amount of heat generated was sufficient to prevent condensation.

Some difficulty was encountered when working with benzene. The action of the benzene on the rubber connections was so rapid that a constant level could not be maintained. The benzene in the reservoir and rubber tube was replaced with water and a water-benzene interface formed in the glass tubing leading to the platform. This interface caused trouble owing to the fact that the static interfacial tension was greater than the dynamic tension. It was necessary, therefore, to build up a head in the first reservoir in order to start the interface moving. After the interface was in motion the head built up was sufficient to keep the lower dynamic interfacial tension moving. Under these conditions it was difficult to control the surface level. This difficulty was overcome by placing a drying tube in the set-up at the outlet of the glass tube leading to the platform. The water-benzene interface was then formed in the bulb of the drying tube. This arrangement worked very nicely.

The cell for angles greater than 90 degrees is quite simple. The structural details, with dimensions, of the cell giving a surface illustrated in Fig. 8 are shown in Fig. 11. The general application of this cell is the same as the previous one, i.e., it is connected to the reservoir, grounded, etc. Water was the only liquid used in this cell.

Figure 12 shows the assembled equipment.

PROCEDURE

The following procedure was used in all measure-

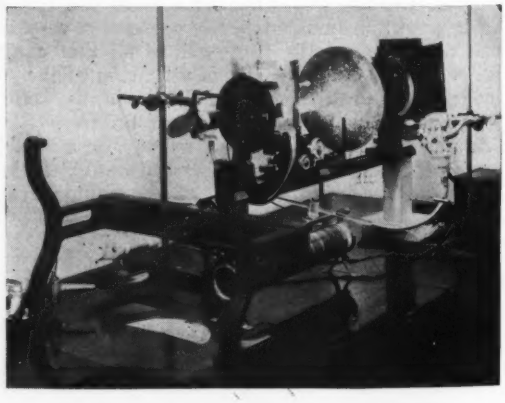

FIG. 12.
Photograph of Assembled Contact Angle Equipment

ments. The faces of the cell, the platform, and the tube leading to the platform were carefully cleansed with warm cleaning solution. The cell was thoroughly washed with distilled water and dried in an oven.

The reservoirs and tubing were filled with the liquid to be studied, care being taken to remove all air bubbles. The cell was then clamped to the stage of the microprojector by means of the frame. The microscope was focused on the edge of the platform and the floor of the platform levelled, arranged at a fixed height, and centered. It was then firmly clamped in place by means of two C-clamps.

The height of the liquid in the first reservoir was adjusted so that its level was slightly below the level of the platform. Any increase or decrease in the height of the liquid surface was obtained by means of the second reservoir.

After the levels had been arranged, an individual fiber was removed from the frayed edge of a torn sheet by means of the tweezers. The tweezers with the fiber were placed in the frame and the microscope focused on the fiber. By means of the thread and nut on the end of the tweezers the fiber was raised and lowered as needed, and turned so that the width of the fiber was perpendicular to the light beam. This is very important since the exact width of the fiber must be known.

The tweezers were then grounded, a paper placed on the drawing board, and the fiber brought into sharp focus. The surface level was then slowly raised by admitting liquid from the second reservoir until the desired height was obtained. The image of the fiber and the surface level was then drawn on the paper. The tweezers were then removed, and the liquid allowed to fall to its normal level. This level was then drawn. This completes a determination. A typical drawing thus produced is given in Fig. 13.

For calculations from the drawings the widths and heights of rise were measured by means of a vernier caliper. By dividing the height by the width, a measure of the angle of contact was obtained. In the present method, personal error is eliminated. The image formed is clear and distinct, and there can be no doubt as to the image to be traced.

By this method a dynamic angle of contact was measured. As the liquid surface is ascending on the fiber a truly dynamic condition exists, and the angle is strictly the dynamic angle. At the magnifications being used it is possible to follow this angle accurately. It was noted that, if the ascension of the liquid surface was suddenly stopped, a gradual change in the angle of contact resulted, i.e., a transition from a dynamic to static angle. However, this transition is gradual, and by making the measurements immediately after the ascension of the liquid surface is stopped, the dynamic contact angle is actually measured.

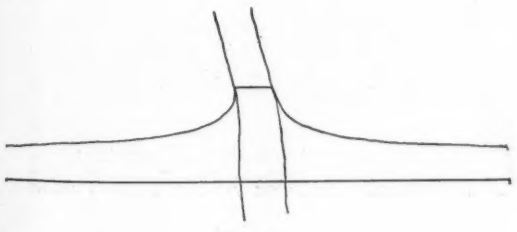

FIG. 13.
Typical Drawing from Photograph Showing Angle of Contact

The rate of ascension of the liquid surface was controlled as uniformly as possible, and the measurements were made immediately after static conditions were obtained. By this procedure it was hoped that at least an approach to the correct dynamic angle of contact was obtained.

The most prevalent error in the method results when the width of the fiber is not perfectly aligned perpendicularly to the light beam. This error can be readily overcome by careful adjustment.

EXPERIMENTAL DATA

Following the procedure just outlined, the height-width ratios of four liquids were studied. These were water, alcohol, formamide, and benzene. These are the liquids which were later used for the determination of pore diameters.

The data obtained for water proved to be the most interesting, since it was only with this liquid that angles different from zero degrees were obtained. It was immediately noticed that the angle formed was not a constant value but varied from point to point along the fiber. As the liquid surface was allowed to ascend slowly on the fiber a very "jerky" motion resulted. The surface would be held back at certain points and then rush forward when the apparent obstruction was passed. The jerky motion was accentuated when the fibers were rosin sized.

Since the angle of contact varies along the fiber, a statistical method had to be used. Values for water are the average of ten or more determinations. Although more than this number would have to be made for very accurate work, it was found that the value obtained for ten readings correlated surprisingly well with certain other physical properties.

Table I contains the height-width ratios obtained for water with fibers taken from the sheets which were used for pore diameter measurements.

TABLE I—VALUES OF *H/W* OBTAINED FOR WATER

Sample	Width cm.(520X)	Height cm.(520X)	*H/W*
Rosin sized, top sized	1.81	0.70	0.39
Rosin sized, not top sized	1.77	1.41	0.80
Rosin extracted, top sized	1.75	2.98	1.70
Rosin extracted, not top sized	1.80	3.64	2.02

These samples are described below under the determinations of pore diameter. They are corresponding samples, one sample of which has been top sized with "gum" (modified starch).

These data, together with data on handsheets not reported here, show that the height-width ratio is decreased by the presence of rosin size and of top size. This indicates that these two materials would cause the angle of contact formed between the water and the fiber to be greater than zero. Thus, in the application of the Lucas equation for pore diameter measurements where water is used for the determination of the rate of capillary rise, a factor for the angle of contact formed between the fiber and the water must be included when the fibers are either rosin sized or treated with "gum" top size.

It has been pointed out that no mathematical expression could be found by means of which the height-width ratios could be converted into degrees. The fundamental theory, however, shows that the angle of contact will decrease as the value of the height of rise divided by the width of the fiber (H/W) increases. Thus the height-width ratios give a qualitative measure of the contact angle. From data taken on other fibers, it was found that, when

the angle of contact formed between the fiber and water is zero, the value of H/W approaches 2.45. Thus, in the samples studied above, it would appear that, even when the rosin size has been removed and the fibers have not been top sized, a zero angle of contact does not exist between the fibers and the water.

In the applications of this method in which alcohol, benzene, and formamide were used, it was found in all cases that the liquid surface proceeded smoothly up the fiber and that a constant value of height divided by width was obtained. From this it can be concluded that the angle of contact formed by these liquids is zero. The values of H/W obtained for the three liquids are listed in Table II.

TABLE II—H/W VALUES FOR ALCOHOL, BENZENE, and FORMAMIDE

Liquid	Height/Width
Alcohol	2.31
Benzene	2.30
Formamide	2.26

These data can be summarized briefly as follows. When water is used for measuring the rate of capillary rise on the samples studied, a factor for the angle of contact formed between the fiber and the water must be included in the Lucas equation if correct values for the pore diameter are to be obtained. A qualitative measure of this factor can be obtained from the H/W ratio. For alcohol, benzene, and formamide the angle of contact is zero and no factor need be included.

Further application of this method with water on other fibers has shown that:

1. The angle of contact on unsized fibers appears to be related to purity of the fibers.
2. For rosin-sized fibers, the angle of contact is closely related to the TAPPI size test.
3. When fibers are rosin sized, the resultant contact angle is an additive effect of the contact angle of the fiber and the angle induced by the rosin size.
4. A zero angle of contact is formed on wet fibers irrespective of the condition of the fiber.
5. Starch surface sizing and glue set with formaldehyde increases the contact angle.
6. Glue by itself is without effect.

Measurement of Contact Angle in Degrees

It has been pointed out that no mathematical interpretation was available by means of which the

FIG. 14.
Photograph Showing Angle of Contact

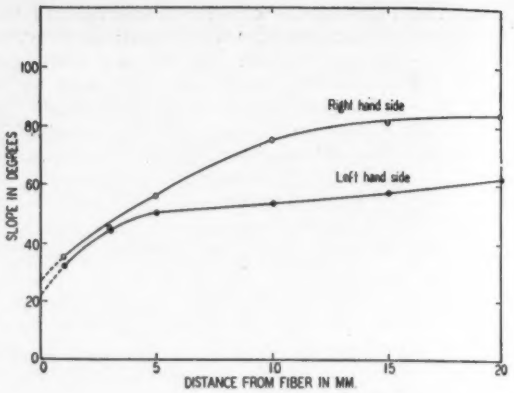

FIG. 15.
Effect of Distance from Fiber on Slope of Liquid Surface
Data from Fig. 14

Right Hand Side		Left Hand Side	
Distance from Fiber, mm.	Angle in Degrees	Distance from Fiber, mm.	Angle in Degrees
20	84	20	62
15	81	15	57
10	75	10	53
5	56	5	50
3	45	3	44
1	35	1	32

height-width ratios could be converted into degrees.

The images formed by this method, however, were clear and distinct and, at the magnification being used, it appeared as though one should be able to actually measure the angle of contact from the image. In this connection several photographs of typical surfaces were made. It was first attempted to measure the angle directly from the photographs by drawing a line tangent to the point of contact. This method proved to be very unsatisfactory. The slope of the surface at the fiber was such that the determination of the correct angle was very difficult. Measurements of the angle on identical prints made at different times led to variations of 10 to 15 degrees, and even greater discrepancies resulted when measurements were made by another person.

It was next attempted to measure the angle by means of an extrapolation method. This method proved to offer an encouraging possibility. By means of a front-faced mirror, normals to the slope of the liquid surface at several points at measured distances from the fiber were drawn.

The angle formed between these normals to the surface, and one drawn to the fiber at its point of contact with the liquid surface, were then measured. These angles correspond to the angles formed between tangents drawn to the slope of the liquid surface and the fiber. This angle at zero distance from the fiber becomes the angle of contact. Thus, if the angles as obtained by the above method are plotted against the distance from the fiber, one might be able to extrapolate the resulting curve to zero distance and thus obtain the angle of contact in degrees. This procedure was carried out on several photographs. A typical set of data thus obtained, together with the photograph, are included in Figs. 14 and 15.

Measurements of Pore Diameters

A theoretical discussion of the factors affecting the rate of ascension of a liquid in a sheet of paper has been given above. A formula developed by Lucas by means of which the effective pore diameter

can be calculated from these data has also been given. This formula in its final form can be written

$$D = (4\eta k)/\omega \qquad (3)$$

The factors tending to cause inaccurate results in the application of this formula were pointed out. These are the swelling action of the liquid, and the angle of contact formed between the fiber and the liquid. These have been treated under their respective headings and their effect on the accuracy of the method evaluated.

Since the affect of these factors are now known, the results obtained by the application of the Lucas equation for the determination of pore diameters can be interpreted with a certain degree of confidence.

PROCEDURE

To study the rate of capillary rise, strips about 15 mm. in width were dipped into various liquids and the rate of capillary ascension followed by means of a cathatometer.

To assure uniform conditions, all tests were carried out in a constant temperature room, and all samples were humidified at least 24 hours before using. The temperature of the room was controlled at 70 deg. F. and the samples were conditioned at 65 per cent relative humidity.

The materials consisted of two samples of No. 1 sulphite bond. The first sample was taken from a paper machine immediately before the sheet was to enter the surface-sizing tub, and the second was taken from the finished paper. In order to insure that the fundamental characteristics of the two would be as nearly identical as possible, the samples were taken from adjacent positions in the web.

Top sizing of the second sample was carried out by passing the sheet through a tub of 100 per cent "gum" (modified starch) at a consistency of about 4 deg. Bé. The temperature of the tub was maintained at 120 deg. F.

By extracting the rosin size from a portion of each of these two basic materials, two other samples were prepared. The samples were extracted in Soxhlet extractors with acidulated alcohol. The extractors were allowed to empty at least 20 times.

The rate of capillary rise was measured in both the machine and across the machine directions.

Four liquids were used: water, formamide, alcohol, and benzene. Determinations were made on all samples with alcohol and benzene, while only the extracted samples were used with water and formamide.

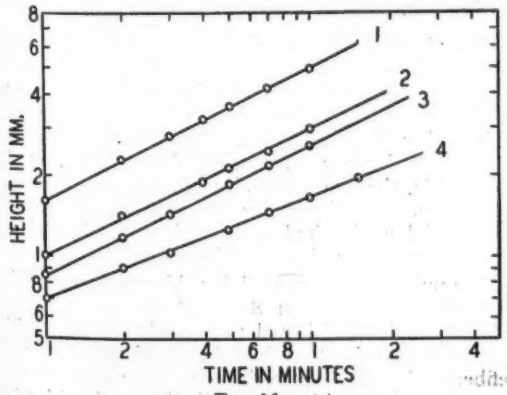

FIG. 16.
Log/Log Relation Between Height of Capillary Rise and Time. One hundred per cent sulphite sheet, rosin size extracted, not top sized; strips cut across the machine direction.
1—Benzene, 2—Alcohol, 3—Water, 4—Formamide

In order to eliminate as completely as possible the factor of evaporation from the surface of the sample, all tests were made in a saturated vapor of the liquid being used. To accomplish this the liquid was placed in an Erlenmeyer flask and stoppered. Tests were not started until sufficient time had elapsed to insure complete saturation of the gas phase with the vapor. To start a test the cork in the flask was removed and a cork with the sample fitted into a slit made in its bottom face was immediately inserted. A stop watch was started as soon as the strip was arranged.

Heights were measured at various times depending upon the sample and the liquid being used.

Table III contains a typical set of data obtained by the method just outlined.

TABLE III
HEIGHT OF CAPILLARY RISE IN MM. OF WATER IN A 100 PER CENT SULPHITE SHEET

Sample	1 Min.	2 Min.	3 Min.	4 Min.	5 Min.	7 Min.	10 Min.	15 Min.	20 Min.
Not top sized									
Rosin extracted, CD..	8.7	11.8	14.2	...	18.1	21.5	25.9	32.6	...
Rosin extracted, MD..	11.1	14.5	17.3	...	21.9	25.7	30.8	38.1	...
Top sized									
Rosin extracted, CD..	...	5.7	...	7.7	...	9.8	11.7	14.0	16.2
Rosin extracted, MD..	...	7.4	...	9.6	...	12.1	14.3	17.1	19.7

The height of capillary rise was then plotted on log-log graph paper against time. A typical set of curves thus obtained is shown in Fig. 16.

From these data the pore diameters of the various samples were calculated by means of the Lucas equation. These results are given in Table IV.

TABLE IV—CALCULATED PORE DIAMETERS IN MICRONS

Sample	Water	Formamide	Alcohol	Benzene
Not top sized				
Rosin extracted, CD.....	0.0617	0.1455	0.5179	0.4224
Rosin extracted, MD.....	0.0967	0.2317	0.7053	0.6080
Rosin sized, CD.....	.....	.....	0.3726	0.2692
Rosin sized, MD.....	.....	.....	0.6212	0.3951
Top sized				
Rosin extracted, CD.....	0.0123	0.0556	0.3559	0.2650
Rosin extracted, MD..	0.0205	0.0620	0.3768	0.2934
Rosin sized, CD.....	.....	.....	0.3098	0.1996
Rosin sized, MD.....	.....	.....	0.3745	0.2507

In these results it is to be noted that a different value for the pore diameter is obtained for each liquid used, but the order of magnitude is always the same, i.e., water, formamide, benzene, and alcohol. These differences can be rationalized by means of the swelling, and contact angle data presented earlier. It was shown that, as regards swelling, the pore diameter values should follow the series, formamide, water, and alcohol, the smallest values being obtained by the use of formamide. No data are available for benzene. On the other hand, it was shown from the contact angle data that like values should be obtained for alcohol, benzene, and formamide, and a somewhat smaller value for water. When these facts are considered the variations in the values can be explained. Water and formamide give small pore diameter values because of their strong swelling action and, in the case of water, because of a contact angle greater than zero. The contact angle of water predominates over the greater swelling action of formamide so that, in the final result, a smaller pore diameter is indicated for water than for formamide.

It would appear that the most correct value is obtained by the use of alcohol, since the angle of contact is zero and the swelling effect is very small. The smaller value obtained for benzene, as com-

pared with alcohol, would indicate that benzene swells cellulose more strongly than alcohol, since the angle of contact of benzene, like alcohol, is zero.

It is also to be noted from the data that the effective pore diameters are larger in the machine than across the machine direction, and that surface sizing decreases the size of the pores, and decreases the difference between the machine and the cross machine values.

Conclusions

The angle of contact formed between the fiber and water varies from point to point along the fiber and the average value varies with the type of fiber.

The angle of contact is decreased by bleaching and purification.

The TAPPI size test is closely related to the contact angle.

With rosin-sized fibers the contact angle appears to be an additive effect of the original angle of contact of the fiber and that induced by the rosin size.

Starch surface sizing and glue set with formaldehyde increase the angle of contact. Glue alone is without effect.

The angle of contact formed by alcohol, benzene, and formamide with the materials investigated is zero degrees.

Pore diameters indicated for the various liquids can be correlated by means of swelling and contact angle data.

Values presumably close to the correct value of the effective pore diameter can be obtained by the use of alcohol.

Surface-sizing materials decrease the size of the pores.

Pore diameters are larger in the machine than across the machine direction.

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Relation Between Delignification and Strength Characteristics of Very Raw Pulps*

by Harry F. Lewis[1] and Charles A. Richardson, II[2]

Abstract

A very raw spruce pulp containing 22.2 per cent of lignin made by the neutral sulphite process has been delignified by the kraft process to yield four pulps having 17.7, 15.9, 12.7, and 8.6 per cent of lignin, respectively.

Physical tests and swelling studies have been made on these pulps. The physical tests showed that, as the lignin content decreased, the strengths of the beaten pulps increased to give a maximum at the low lignin value. At the same time such characteristics as shrinkage, apparent density, and porosity of the handsheets made at a freeness of 250 cc. also increased with the decrease in lignin. Stiffness, on the other hand, decreased with decrease in lignin content.

Swelling pictures showed rather characteristic structural differences between the pulps. The two pulps having the highest lignin values were swollen only a relatively small amount by cuprammonium solution, and in no case was there any ballooning. The two pulps containing the intermediate lignin contents (15.9 and 12.7 per cent) exhibited more swelling and some ballooning. The pulp with the lowest lignin content (8.6 per cent) and the highest strength characteristics showed considerable ballooning and solution of the fiber in the swelling agent. The swelling behavior indicated that the fibers of the first two pulps were covered with a coating of stiff, nonswelling, and nonelastic lignin. As delignification proceeded, this gradually dissolved with the consequent liberation of cellulose surfaces of an increasing number of fibers. When the lignin content decreased to 8.6 per cent, it appeared as though the outer lignin sheath had almost entirely dissolved and the residual lignin was located mainly within the secondary wall of the fiber.

The physical characteristics of rather completely delignified pulps have been extensively investigated within the range of delignification covered in normal pulping operations. This is not the case, however, with highly lignified pulps. This investigation was undertaken for the purpose of determining, as far as possible, the characteristics of such pulps as contain amounts of lignin far in excess of the normal commercial unbleached pulps and of the handsheets made from these pulps after beating.

Five pulps were prepared for this purpose, ranging in lignin content from 8 to 22 per cent. Spruce chips were first subjected to a mild neutral sulphite treatment in order to soften the wood sufficiently for defibering in a laboratory beater. Four separate portions were then subjected to alkaline cooks, identical in all conditions except the time at maximum temperature. The chemical constants, physical properties, and swelling behavior of these pulps were de-

* Presented at the Fall Meeting of the Technical Association of the Pulp and Paper Industry, Syracuse, N. Y., September 12-14, 1939.
An portion of a thesis submitted by the junior author in partial fulfillment of the requirements of The Institute of Paper Chemistry for the degree of Master of Science from Lawrence College, Appleton, Wis., June, 1937.
[1] Member TAPPI, Dean, The Institute of Paper Chemistry, Appleton, Wis.
[2] Member TAPPI, Student, The Institute of Paper Chemistry, Appleton, Wis.

termined. By means of the swelling behavior, it was possible to determine the general course of the delignification from the standpoint of modification of wood structure.

Historical

Little work has appeared describing the strength characteristics of very raw pulps, although there are a number of papers dealing with the characteristics of unbleached pulps of a commercial grade.

Genberg and Houghton *(1)* investigated the strength characteristics of unbleached sulphite pulps in relation to the amount of delignification of these pulps as indicated by the Roe chlorine number. The authors believed it to be logical, when all factors were considered, that a high chlorine number should indicate a pulp with a high bursting and a low tear test. As the chlorine number decreases, the Mullen should decrease and the tear increase to a certain point, after which they might both be expected to decrease.

From a tabulation of 311 observations of strength properties of unbleached pulps of varying chlorine numbers, Genberg and Houghton concluded that the Mullen increased with the chlorine number and that the tear increased up to a chlorine number of 3.7 or 3.8, after which it dropped, whereas the Mullen continued to rise at an increasingly slower rate. This is an average relation for the same grade of unbleached sulphite pulp. There is no such relation for different grades of unbleached sulphite pulps.

The exact location of the point of delignification at which the pulp has its maximum strength and freeness is dependent, no doubt, on local conditions, such as wood, cooking temperature, time, etc.

Hall *(2)* compared the strength properties of unbleached sulphate pulps of various lignin contents up to 7.7 per cent. In the unbeaten pulps, as the lignin content increased, the original freeness increased, the breaking length decreased, the burst decreased slightly, the tear increased slightly, and the porosity increased. With the beaten pulps, as the lignin content increased, the maximum breaking length, maximum burst, and tear increased. The tear showed a maximum at about 5 per cent lignin. The harder pulps were more porous at the same strength of sheet.

Johansson *(3)* studied the relation between the Roe chlorine number and the strength of unbleached pine and spruce kraft pulps. He carried out his experiments so as to include a pulp with a chlorine number of 9. In the unbeaten pulps, as the lignin content increased, the breaking length and burst decreased, and the tear remained almost constant. At 45 degrees Schopper-Riegler freeness, the breaking length and bursting strength increased to a maximum at a Roe chlorine of about 7, corresponding to a lignin content of about 7 per cent. As the lignin content increased, the tear showed a slight decrease, and the time of beating necessary to reach a freeness of 45 degrees increased.

Experimental

Preparation of Pulps

One-half inch spruce chips were cooked with neutral sulphite liquor prepared by passing sulphur dioxide gas into a soda ash solution until the sulphite content as determined by iodine titration indicated that one-half of the sodium carbonate had been converted to sodium sulphite, or so that this equation had been satisfied:

$$2\ Na_2CO_3 + H_2SO_3 = Na_2SO_3 + 2\ NaHCO_3.$$

The liquor was then made very slightly alkaline (to phenolphthalein) with sodium hydroxide. The amount of chemical used in cooking was 15 per cent of sodium sulphite and 7 per cent of sodium bicarbonate, figured on the weight of dry wood. The water to wood ratio was 3:1. The temperature was raised to 110 deg. C. in one half-hour; the digester was relieved for several minutes, and then raised to 140 deg. C. in another half-hour, where it was maintained for three hours. The cooked chips were then washed in a 5-pound beater and beaten just enough to break up the chip form.

Four separate portions of the defibered neutral sulphite pulp were cooked with a kraft liquor in which the ratio of sodium hydroxide to sulphide was 2:1. The concentration of the cooking liquor in each case was 5 per cent, expressed as sodium hydroxide (determined by titrating with acid using methyl red as indicator). The active alkali figured to 27 per cent of the dry neutral sulphite pulp, and the water to "wood" ratio was 9:1. The temperature was raised to 140 deg. C. in one-half hour and maintained at 140 deg. C. for one, two, four, and six hours. All the cooks were made in gas-heated horizontal rotary digesters having a capacity of about 500 grams of dry chips.

A portion of each of the pulps was screened on a laboratory vibrating flat screen, pressed, and stored at a moisture content of about 75 to 80 per cent.

Testing Methods

The pulps were tested for lignin content, pentosan content (Institute Methods), and alpha-cellulose content (TAPPI Standard Method T 203 m-36).

Beater runs were made on the pulps in a Valley laboratory beater, using 360 grams of pulp in 23 liters of water, with 6500 grams on the bedplate.

Handsheets were made and were tested for basis weight (24 x 36—500), caliper, bursting strength (Mullen), tearing strength (Elmendorf), folding endurance (M.I.T.), tensile strength, stiffness (Gurley), and porosity (using the Gurley densometer). The apparent density was calculated by dividing the basis weight by the caliper. The tensile strength is expressed as the breaking length, which is the length in meters of a strip 15 mm. wide which would break under its own weight. The stiffness results are expressed as milligrams. The porosity is expressed as the number of seconds required for 100 cc. of air to pass through a 1-inch circle of the sample. The shrinkage tests were made by marking a 5-inch square on a wet sheet, drying the sheet in an oven, and measuring the perimeter of the square. This test gives an indication of the hydration of the stock independent of cutting.

The swelling behavior of fibers from each of the five pulps, both unbeaten and at a freeness of approximately 250 cc. (Schopper-Riegler), was studied in cuprammonium hydroxide solution containing 15 grams of copper and 200 grams of ammonia per liter. The fibers were mounted in water on a microscope slide, and the cuprammonium hydroxide solution added from a medicine dropper on one side of the cover glass and sucked across the fibers by the capillary action of a piece of filter paper cut to fit the slide. The fibers were thoroughly washed by repeated additions of cuprammonium hydroxide solution until no more action was visible.

Chemical Properties of the Pulps

The chemical constants of the five pulps are given in Table I. Pulp I represents the original sulphite cook and Pulps II to V kraft cooks of Pulp I for one, two, four, and six hours, respectively.

TABLE I.—CHEMICAL CONSTANTS OF THE PULPS

Pulp	Lignin per cent	Pentosans per cent	Alpha-Cellulose (Uncorrected) per cent	Lignin in Alpha-Cellulose per cent	Alpha-Cellulose (Corrected) per cent	Total of Lignin and Corrected Alpha-Cellulose per cent	Beta- and Gamma-Cellulose* per cent
I	22.2	11.2	96.4	23.8	73.5	95.7	4.3
II	17.7	9.7	94.8	21.2	74.7	92.4	7.6
III	15.9	9.2	93.0	16.9	77.3	93.2	6.8
IV	12.7	8.5	91.4	14.0	78.6	91.3	8.7
V	8.6	8.2	88.5	9.0	80.5	89.1	10.9

* Computed by subtraction of the sum of lignin and alpha-cellulose from 100 per cent.

These values indicate that the pulps produced by the progressive action of the alkaline liquor for extended periods become relatively poorer in lignin and pentosans as the cooking proceeds and relatively richer in alpha-cellulose. Conversion of alpha-cellulose into beta- and gamma-celluloses likewise occurs. The lignin content of the alpha-cellulose is practically the same as that of the original pulp, showing that very little lignin was dissolved by the caustic treatment. Although the pulps produced by the longer cooking periods contain less pentosans, the total hemicellulose content, as measured by the beta- and gamma-cellulose values, has increased.

Physical Properties of the Pulps

A comparison of the properties of the unbeaten pulps and of those beaten to a freeness of 250 cc. is shown in Tables II and III.

TABLE II.—STRENGTH OF UNBEATEN PULPS

Pulp	Freeness	Burst Factor	Tear Factor	Double Folds	Breaking Length	Shrinkage	Apparent Density	Stiffness*
I	865	14	79	1	711	0	3.0	287
II	885	13	142	1	1120	1.6	3.6	294
III	890	16	157	1	1180	1.8	4.8	266
IV	875	26	171	5	1980	2.8	4.8	154
V	870	49	253	21	3100	2.6	5.7	122

* Stiffness after thirty minutes of beating.

TABLE III.—STRENGTH OF PULPS AT A FREENESS OF 250 CC.

Pulp	Beating Time to 250 cc.	Burst Factor	Tear Factor	Double Folds	Breaking Length	Shrinkage	Apparent Density	Stiffness	Porosity
I	216	120	80	125	8,300	2.2	8.7	115	160
II	205	149	100	1000	10,000	9.0	10.5	125	300
III	210	153	105	1125	9,700	9.8	10.3	80	330
IV	180	150	110	1150	9,800	10.0	10.8	85	240
V	165	177	100	2400	10,600	11.2	12.0	65	580

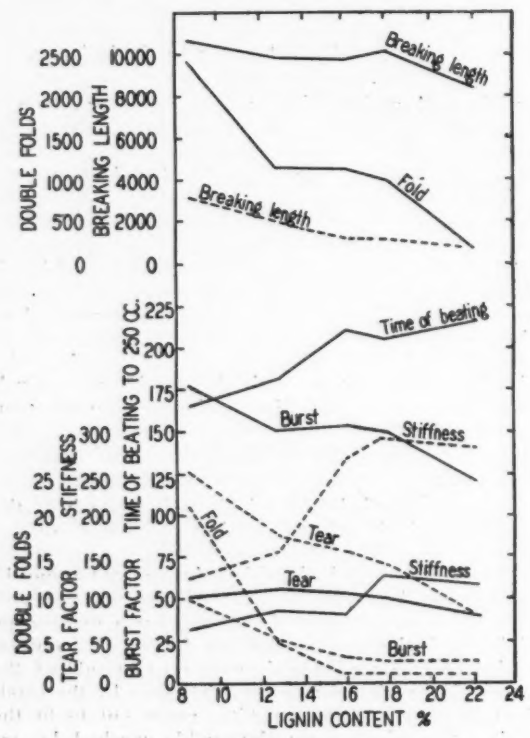

FIG. 1.
Strength Properties vs. Lignin Content.

Figure 1 shows the various strength properties of the unbeaten and beaten pulps plotted against the lignin content.

In the case of the unbeaten pulps, as the lignin content decreased, the shrinkage (hydration), apparent density, bursting strength, folding endurance, tearing strength, and tensile strength increased, and the stiffness decreased.

With the beaten pulps, as the lignin content decreased, the shrinkage, apparent density, bursting strength, folding endurance, and tensile strength increased, the tearing strength remained fairly constant, and the stiffness, porosity, and time of beating to 250-cc. freeness decreased.

The strength, as indicated by the burst and tensile, showed a decided increase at a lignin content of between 14 and 16 per cent. The ease of beating and densometer readings started to increase and the stiffness to decrease at this same range.

There are apparently three different kinds of swelling behavior exhibited in this series of pulps. Pulps I and II (22.2 and 17.7 per cent lignin) showed only slight swelling and no ballooning. Pulps III and IV (15.9 and 12.7 per cent lignin) exhibited more swelling and some ballooning, and Pulp V (8.6 per cent lignin) showed considerable ballooning and more of the fibers dissolved in the cuprammonium solution. In Pulps I and II, the lignin sheath is still intact; in Pulps III and IV, it is weakened in some places but is still present; and in Pulp V it has been removed to a greater extent.

In general, the beaten fibers swelled more easily and possibly exhibited more ballooning than did the unbeaten fibers.

It would appear that the ability of a highly lignified pulp to develop strength on beating is related to the location of the lignin on the fiber, fibers which are covered with lignin on their surfaces forming a stiff sheet of relatively lower strength than lignified fibers where the residual lignin is mainly in the secondary wall.

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Imports of Paper and Paper Stock

Giving Manifests of New York, Boston, Philadelphia and Other Ports of Newsprint, Wrapping, Writing, Coated, Blotting, Tissue, Strawboard, Wallboard, Cigarette Papers, Sulphite, Kraft and Ground Wood Pulp.

NEW YORK IMPORTS

WEEK ENDING SEPTEMBER 30, 1939

SUMMARY

Newsprint .....4 bls., 13,377 rolls
Packing paper .....100 bls.
Filter paper .....5 cs.
Metal covered paper .....21 cs.
Photo paper .....1 cs.
Tissue paper .....110 bbls., 1 cs.
Straw boards .....180 rolls, 802 bdls.
Miscellaneous paper .....36 bls., 70 cs.

NEWSPRINT

Bowater Lloyds Sales Co., Ltd., *Tilia Gorthon,* Cornerbrook, 4 bls, 1,669 rolls.
News Syndicate Co., Inc., *Brand,* Comeau Bay, 7,279 rolls.
International Paper Co., *International #1,* Gatineau, 280 rolls.
National Pulp & Paper Co., *Stavangerfjord,* Oslo, 777 rolls.
International Paper Co., *G.D.D.,* Gatineau, 277 rolls.
International Paper Sales Co., *G.T.D.,* Gatineau, 278 rolls.
International Paper Co., *Dudley Murray,* Gatineau, 411 rolls.
International Paper Sales Co., *A.C.D.,* Gatineau, 272 rolls.
International Paper Co., *Glen Williams,* Gatineau, 398 rolls.
International Paper Co., *Matie E. Murray,* Gatineau, 414 rolls.
International Paper Co., *J. M. Bussey,* Gatineau, 397 rolls.
Walker Goulard Plehn Co., Inc., *Donald McKay,* Kotka, 154 rolls.
Lunham & Reeve, Inc., *Donald McKay,* Kotka, 283 rolls.
Jay Madden Corp., *Donald McKay,* Kotka, 196 rolls.
H. Reeve Angel & Co., Inc., *Donald McKay,* 228 rolls.
Jay Madden Corp., *Donald McKay,* Koivisto, 64 rolls.

PACKING PAPER

J. P. Heffernan Paper Co., *Pr. Adams,* Genoa, 100 bls.

FILTER PAPER

A. Giese & Son, *Zaandam,* Rotterdam, 5cs.

METAL COVERED PAPER

Rohner Gehrig & Co., *Conti di Savoia,* Genoa, 21 cs.

PHOTO PAPER

——, *American Farmer,* London, 1 cs.

TISSUE PAPER

Jay Madden Corp., *Donald McKay,* Helsingfors, 1 cs., 110 bbls.

STRAW BOARDS

A. B. Massa Corp., *Zaandam,* Rotterdam, 180 rolls, 802 bdls.

MISCELLANEOUS PAPER

Japan Paper Co., *Hulda Maersk,* Kobe, 55 cs.
Remington Rand, Inc., *Hulda Maersk,* Kobe, 15 cs.
R. Wilson Paper Corp., *Stavangerfjord,* Halden, 36 bls.

RAGS, BAGGING, ETC.

——, *Tonsbergfjord,* Antwerp, 107 bls. rags.
——, *Pr. Adams,* Bombay, 450 bls. cotton waste.
D. S. Stern Corp., *Pr. Adams,* Bombay, 100 bls. cotton waste.
Burka Bagging Co., Inc., *Fort Townshend,* Halifax, 134 bls. bagging.
J. Levy & Son, *Oriente,* Havana, 27 bls. bagging.
Atlas Waste Manfy. Co., *Oriente,* Havana, 40 bls. cotton sweepings.

CASEIN

Tupman Thurlow Co., Inc., *Hektor,* Buenos Ayres, 1,168 bags, 220,650 kilos.
American & British Chemical Supplies, *Hektor,* Buenos Ayres, 1,454 bags, 165,790 kilos.

WOOD PULP

Castle & Overton, Inc., *Clara,* Trieste, 168 bls. wood pulp.
E. M. Sergeant Pulp & Chemical Co., *Stavangerfjord,* Nygard, 125 bls. dry bleached sulphite.
Atterbury Bros., Inc., *Stavangerfjord,* Oslo, 500 bls. dry chemical pulp.
J. Andersen & Co., *Stavangerfjord,* Oslo, 1,500 bls. dry sulphite.
The Borregaard Co., Inc., *Stavangerfjord,* Sarpsborg, 228 bls. unbleached sulphite.
Pulp Sales Corp., *Donald McKay,* Trangsund, 57 bls. wood pulp, 11 tons; 3,627 bls. sulphate, 620 tons.

WOOD PULP BOARDS

Jay Madden Corp., *Donald McKay,* Trangsund, 44 bls.

BOSTON IMPORTS

WEEK ENDING SEPTEMBER 30, 1939

Price & Pierce, Ltd., *Donald McKay,* ——, 180 bls. bleached sulphite.

PORTLAND IMPORTS

WEEK ENDING SEPTEMBER 30, 1939

M. Sone, *Mormachawk,* Stockholm, 300 bls. wood pulp.
M. Sone, *Hjelmaren,* Stockholm, 459 bls. wood pulp.

PHILADELPHIA IMPORTS

WEEK ENDING SEPTEMBER 30, 1939

Continental Bank Trust Co., *Clara,* Algiers, 300 bls. rags.
M. Sone, *Lidvard,* Sundsvall, 600 bls. wood pulp.
J. W. Hampton, Jr., & Co., *Donald McKay,* Kotka, 334 rolls, 25 bls. newsprint.
Wilkinson Bros., & Co., Inc., *Donald McKay,* Kotka, 200 rolls newsprint.
Public Ledger, Inc., *Donald McKay,* Kotka, 642 rolls newsprint.
Jay Madden Corp., *Donald McKay,* Kotka 271 rolls newsprint.
Pulp Sales Corp., *Donald McKay,* Kotka, 1,400 bls. dry mechanically ground pulp, 280 tons.
J. W. Hampton Jr. & Co., *Donald McKay,* Trangsund, 129 rolls newsprint.
Pulp Sales Corp., *Donald McKay,* Helsingfors, 260 bls. dry mechanically ground pulp, 52 tons; 160 bls. bleached sulphite, 26 tons.
Jay Madden Corp., *Donald McKay,* Helsingfors, 49 rolls newsprint.
M. Sone, *Donald McKay,* Stockholm, 150 bls. dry sulphite, 25 tons.
——, *Donald McKay,* Stockholm, 300 bls. unbleached sulphite, 50 tons.

WILMINGTON IMPORTS

WEEK ENDING SEPTEMBER 30, 1939

Pulp Sales Corp., *Donald McKay,* Koivisto, 80 bls. sulphite, 16 tons, 1,792 bls. bleached sulphite, 358 tons.
Pulp Sales Corp., *Donald McKay,* Trangsund, 3,320 bls. sulphite, 664 tons.

NEWPORT NEWS IMPORTS

WEEK ENDING SEPTEMBER 30, 1939

Bowater Paper Co., Inc., *Tilia Gorthon,* Cornerbrook, 70 rolls, 536 bdls. newsprint.
International Paper Sales Co., *Tilia Gorthon,* Cornerbrook, 2,506 rolls newsprint.

Winners in Crossett Contest

The Crossett Paper Mills announces the winners in its weight lifting contest recently conducted at the National Paper Trade Association's Convention.

In the lightweight division, G. J. Smart of the Hammermill Paper Company, Erie, Pa. won with a lift of 390 lbs. Herbert Pusheck of the General Shippers Supply Company, Chicago, Ill. was runner up with a lift of 380 lbs. In the middleweight division, C. E. Eaton of the Ludlow Manufacturing and Sales Company, Chicago, Ill. was crowned champion with a lift of 420 lbs., and his associate, T. A. Bittenbender was runner up with a lift of 415 lbs. In the heavyweight division, W. E. Hewens of the Sorg Paper Mills, Middletown, Ohio won top honors with a lift of 430 lbs., and Ralph Laue of Bradner Smith & Co., Chicago, Ill. was runner up with a lift of 320 lbs.

The high man of each division received a check for $10.00, and the runner up in each division received a check for $5.00.

As an interesting sidelight it may be mentioned that Mr. Eaton was the strong man of Williams College for four years, and although a number of years has passed it is quite evident that he still retains his championship form. Furthermore, Bill Hewens said that he could do better if he hadn't been afraid of hurting his back. At any rate, his lift was the greatest in all divisions, and of all participants.

To Be Executive Secretary

A. H. Chamberlain, executive secretary of The National Paper Trade Association, announces that Robert H. Ziegler has been appointed assistant secretary and will join the staff of the organization in a few weeks.

Mr. Ziegler has been a well known and popular mill salesman in the middle West. For the past five years he has very successfully represented Menasha Products Company in Michigan, Indiana and Kentucky. Previous to that he was for two years with the Container Corporation and before that had some experience in advertising and promotional work. His education included two years at the University of Michigan, after which he took an extension course in Law.

Mr. Ziegler's activities have given him thorough familiarity with Paper merchants' operations and problems and many of his friends in the trade have expressed themselves enthusiastically as to his fitness for his new position.

New England Paper Men Meet

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., October 2, 1939—A meeting of the New England Paper Merchants Association was held at the Parker House Thursday evening, with about 40 attending and President John H. Brewer in the chair.

After a brief business session, Mr. Ransom, a New England representative of the Union Bag and Paper Corporation, discussed conditions in the wrapping paper market, and Henry Savage, sales manager of the International Paper Company, spoke on the situation in the fine paper market.

Important Notice

Your attention is called to customs regulation T. D. 49,970 which is printed below and which was issued recently. This order was issued unexpectedly without giving those interested an opportunity for a hearing. It is strongly urged that all persons interested write or wire Hon. Henry L. Morgenthau, Secretary of the Treasury to do his utmost to have this order rescinded as otherwise the imports of paper and paper stock, which have been appearing in the PAPER TRADE JOURNAL ever since the paper was started 68 years ago, may no longer be printed. The order follows:—

T. D. 49,970.
Customs Regulations,
Confidential Information,
To Collectors of Customs and others concerned:

Article 1465 Customs Regulations of 1937 (Sec. 25.2) is hereby amended by adding a new paragraph (o) reading as follows:

(o) Sec. 25.2 (o)—During the effective period of any proclamation of the President that a state of war exists between foreign nations, information concerning imports and exports shall not be disclosed except as provided for in Paragraphs (e) and (h) of this article.

This regulation shall be effective on and after the date of publication in the Federal Register, (R.S. 161; U.S.C. 22.)

(signed) BASIL HARRIS
Commissioner of Customs.

Approved Sept. 22nd, 1939,
Herbert E. Gaston. Actg Sec. Treasury.

To Resume Logging Operations

[FROM OUR REGULAR CORRESPONDENT]

VANCOUVER, B. C., September 30, 1939—First stimulus to Pacific Coast industry directly traceable to war comes with the announcement by the B. C. Pulp and Paper Company that re-opening of its big Spry Camp logging operations has been ordered to supply pulpwood for the Port Alice Mill.

Loggers, buckers and cold deckers have left Vancouver for Spry Camp and other camp employees will follow.

Both the company's mills at Port Alice and Woodfibre, B. C. are now operating at full capacity, producing 320 tons of bleached sulphite and rayon pulp daily. The mills now employ 800 men with an additional 200 in the logging camps, exclusive of loggers employed by independent operators who supply pulpwood to the company.

Paper Board Prices Firm

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., October 2, 1939—Paper board prices are exceedingly firm. Chip board is higher, up to $45, with some mills asking even higher figures.

It is difficult to obtain quotations on foreign paper stock, owing to the inability of the trade to secure shipping permits. There is a big range of prices. Rumor has it that foreign dark cottons have sold at 2 cents on the dock, a spot lot on hand in New York. Prices of many grades of paper stock made radical advances.

Manila rope has shown a jump in prices. It is understood that domestic sellers will not quote.

New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, October 4, 1939.

Expansion in the volume of the nation's business continues and reports over a wide area indicate that, while the first upward surge of buying has receded to some extent, orders continue to be placed for the future. Speculative buying is generally reported to continue, but reports are also coming in to show that consumer demand is also increasing.

The index of general business activity for the week ended September 17 advanced to 101.1 per cent, from 99.8 per cent for the preceding week, compared with 85.9 per cent for the corresponding week last year. Production of 209 paper mills for the week ended September 23 was estimated at 93.5 per cent, compared with 78.4 per cent for the like period last year. Paper board production for the week ended September 23 rose to 80.0 per cent, compared with 68.0 per cent for the corresponding week last year.

No important change in the newsprint situation has been reported this week. Little speculative buying is reported. Consumption is slightly higher and a small increase is reported in advertising linage. Gains shown by six large dailies in New York for the first eight months of this year are 1½ per cent above the same period last year.

Orders for many grades of paper are in excess of production, according to reports received from many manufacturers' representatives, jobbers, and general paper merchants. Although no important advances have been generally reported in resale prices of paper, prices are reported to be shifting to a higher level. This change is also true of a wide variety of materials and products.

One large manufacturer reports that its contract prices on book paper will remain unchanged to its customers for the balance of this year. Book papers for resale to general paper merchants have advanced $5 to $10 per ton. This increase is applicable to a wide variety of papers, such as coated book, lithographic, and the lower grades of sulphite bonds and tablet papers. Many fine writing paper mills report operations at or close to capacity.

Kraft paper production continues at a very high level, production and shipments for the current week being about double that of last year. Orders for kraft liner board are so greatly in excess of production that some mills are no longer accepting orders. The current quotations of one large manufacturer on kraft liner board is $45 per ton for Fourdriner board and $47.50 for cylinder board.

Paper board production and sales continue at a high level. According to sales reports of the Folding Box Association, sales rose sharply in August and were 19½ per cent higher than for that month last year. The gain for the first eight months of 1939 was 9.6 per cent above that of last year.

Mechanical Pulp

Production and shipments of mechanical pulp are reported as continuing at a high level. No change in domestic or Canadian prices have been reported for the current week. Quotations on No. 1 imported mechanical pulp, moist and dry, are currently quoted at $30 to $35 per ton, on dock, Atlantic Ports.

Chemical Pulp

The loss of eight Swedish ships by submarine attacks has caused that government to suspend, until further notice, all shipments of wood pulp, cellulose, and timber to England from Sweden. This drastic ruling does not apply to shipments to the United States. A current report states that a Swedish ship with wood pulp consigned for a South American port has been sunk by submarine attack. Current quotations on imported pulp are as follows: prime bleached sulphite, 2.50 to 3.00; easy bleaching, 2.20 to 2.35; strong unbleached sulphite, 2.10 to 2.30; No. 1 kraft, 1.60 to 1.70. Extra ocean freight charges and war insurance is now added to all quotations on imported pulp.

Old Rope and Bagging

No important change in the old rope market has been reported this week. Prices are nominal with old domestic Manila continuing at the prevailing basis price of 3.00. Quotations on old bagging are nominal with much confusion prevailing in this market as to the price level.

Rags

Quotations on all grades of new and old domestic rags continue nominal. New white No. 1 shirt cuttings are currently quoted at from 8.25 to 8.50, new unbleached at from 8.00 to 8.25, and No. 2 roofing rags at 1.50 to 1.60.

Old Waste Paper

The old waste paper market continues firm with some scaling down of last week's sharp price advances in some grades. No. 1 mixed paper is currently quoted at from .55 to .60, and strictly folded news at from .60 to .65.

Twine

Production and sales of twine are reported as active. Prices on all grades of hard and soft fiber twines are firm, with no important change from prevailing quotations reported for the current week.

Southern Testing House Moves

The Southern Testing House of the United States Testing Company will be located at new headquarters, 1200 Arlington street, Greensboro, N. C., after October 15.

The Testing Company has moved its Southern branch to larger quarters so as to better handle the increased volume of testing in the South.

The Southern Testing House will be open for inspection after October 15 and all visitors are welcome.

Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, October 4, 1939.

BLANC FIXE—Prices on blanc fixe are firm under a good demand. No change in prices has been reported for the current week. The pulp is currently quoted at from $42.50 to $45 per ton, in bulk; the powder is offered at from 3½ to 3¾ cents per pound, in barrels, at works.

BLEACHING POWDER—Quotations on bleaching powder are firm under active buying this week, with no change from prevailing market quotations reported. Bleaching powder is currently quoted at from $2 to $2.85 per 100 pounds, in drums, at works.

CASEIN—The demand for casein continues active and prices are firm, with no important changes reported this week. Standard domestic casein, 20-30 mesh, is currently quoted at 20 cents per pound; 80-100 mesh, at 20½ cents per pound; all prices in bags, car lot quantities.

CAUSTIC SODA—Quotations on caustic soda are firm under active buying. Solid caustic soda is currently quoted at from $2.30 to $2.40 per 100 pounds; flake and ground at from $2.70 to $2.95 per 100 pounds, in drums, at works.

CHINA CLAY—Quotations on china clay continue firm under a steady demand. No change from prevailing prices has been reported this week. Domestic filler clay is currently quoted at from $7 to $15 per ton; coating clay at from $11 to $22 per ton, at mines. Imported clay is quoted at from $13 to $25 per ton, ship side.

CHLORINE—Prices on chlorine are firm and conform to prevailing market quotations. Chlorine is currently quoted at $1.75 per 100 pounds, in single-unit tank cars, f.o.b., works.

ROSIN—The rosin market is reported as firm. Current quotations on some grades are slightly lower. "G" gum rosin is quoted at $5.50 per 280 pounds, gross weight, in barrels, at Savannah. "FF" wood rosin is offered at $5.35 per 280 pounds, gross weight, in barrels, New York. Seventy per cent gum rosin size is quoted at $2.90 per 100 pounds, f.o.b., shipping point.

SALT CAKE—Quotations on salt cake are firm under an active demand. Current quotations range at from $15 to $19 per ton; chrome salt cake at from $14 to $15 per ton, f.o.b., shipping point. Quotations on imported salt cake are nominal.

SODA ASH—Prices on soda ash continue firm with buying active during the current week. Quotations on soda ash in car lots, at works, per 100 pounds, are as follows: in bulk, $.90; in bags, $1.10; and in barrels, $1.35.

STARCH—Quotations on corn starch are reported as firm, with demand active, and no change in prices for this week. Globe pearl is currently quoted at $2.75 per 100 pounds; special paper starch at $2.85 per 100 pounds. All prices in bags, f.o.b., Chicago.

SULPHATE OF ALUMINA—Quotations on sulphate of alumina are firm and unchanged at prevailing market levels. The commercial grades are currently quoted at $1.15; iron free at $1.30 per 100 pounds, in bags, car lot quantities, f.o.b., works.

SULPHUR—Prices on sulphur are firm under a good demand and conform to prevailing market quotations. Annual contracts are currently quoted at $16 per long ton, f.o.b., mines. Spot and nearby car lots are offered at $19 per ton.

TALC—Quotations on talc are firm under a good demand and conform to prevailing market prices. Domestic talc is currently quoted at from $15 to $18 per ton, Eastern mines. Prices on imported talc are nominal.

Market Quotations

Paper

(Delivered New York)

News, per ton—			
Roll, contract	$50.00	@	—
Sheets	58.00	@	—
Kraft—per cwt.—Delivered Zone A			
No. 1 Northern	$4.75	@	$5.25
Superstandard	4.25	@	4.75
Northern Standard Wrapping	4.00	@	
Standard Wrapping	3.62½	@	—
Tissues—Per Ream—Carlots			
White No. 1	.87½	@	—
White No. 1 M. G.	.85	@	—
White No. 1½	.62½	@	—
White No. 2	.60	@	—
Anti-Tarnish M. G.	.75	@	—
Colored	.87½	@	—
Kraft	.75	@	—
Manila	.87½	@	—
Unbl. Toilet, 1 M.	3.25	@	—
Bleached Toilet	5.20	@	
Paper Towels, Per Case—			
Unbleached, Jr.	1.80	@	—
Bleached, Jr.	3.10	@	—
Manila—per cwt.—C. l. f. a.			
No. 1 Jute	7.75	@	9.75
No. 1 Manila Wrapping, 35 lb.	5.00	@	—
No. 2 Manila Wrapping, 35 lb.	4.75	@	—
Boards, per ton—			
News	42.50	@	—
Chip	40.00	@	—
Sgl. Mla. l.l. Chip	52.50	@	—
Jute Lined Chip	52.50	@	—
White Pat. Coated	65.00	@	—
Kraft Liners	45.00	@	—
Binders Boards	71.00	@	77.00

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds	Ledgers
100% Rag Ext. No. 1	$39.10@$46.00	$40.25@$47.25
100% Rag	31.05@ 36.50	32.20@ 37.75
85% Rag	.....	29.90@ 35.00
75% Rag	23.60@ 27.75	24.75@ 29.00
65% Rag	.....	21.65@ 26.25
50% Rag	17.55@ 21.50	18.70@ 22.75
25% Rag	14.65@ 17.75	15.80@ 19.25

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds	Ledgers
No. 1	$8.60@$10.50	$9.75@$12.00
No. 2	7.70@ 9.50	8.90@ 10.75
No. 3	6.75@ 8.25	7.90@ 10.00
No. 4	7.00@ 8.50	8.20@ 10.00

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper, Delivered in Zone 1:

No. 1 Glossy Coated	$11.30@$12.75
No. 2 Glossy Coated	9.70@ 11.00
No. 3 Glossy Coated	8.60@ 10.00
No. 4 Glossy Coated	8.05@ 9.25
No. 1 Antique (watermarked)	8.05@ 9.25
No. 2 Offset	7.45@ 8.50
A Grade E. F.	7.20@ 8.25
A Grade S. & S. C.	7.45@ 8.50
B Grade E. F.	6.65@ 7.75
B Grade S. & S. C.	6.90@ 8.00
C Grade E. F.	6.40@ 7.50
C Grade S. & S. C.	6.65@ 7.75
D Grade E. F.	6.10@ 7.00
D Grade S. & S. C.	6.35@ 7.25

Ivory & India at $.50 cwt. extra

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—			
Moist	30.00	@	35.00
Dry	30.00	@	35.00
(Delivered)			
No. 1 Domestic and Canadian	38.00	@	40.00

Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

Bleached Sulphite (Domestic and Foreign)—			
Prime Bleached Sulphite	2.50	@	3.00
Prime Qualities—Easy-Bleaching Sulphite	2.20	@	2.35
Strong Unbleached Sulphite	2.10	@	2.30
(On Dock, Atlantic Ports)			
Kraft Bleached	2.50	@	3.00
Kraft Light & Strong	1.65	@	1.75
Kraft No. 1	1.60	@	1.70
(F. o. b. Pulp Mill)			
Kraft Domestic	1.60	@	2.00
(Delivered)			
Soda Bleached	2.55	@	—

Add 60 cents per short ton, dock charges for Albany; $2.50 for Lake Ports East and $3.50 for Lake Ports West of Mackinac Straits. Also add extra freight charges and war insurance to all quotations on imported pulp.

Domestic Rags

New Rags

All prices nominal.

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1	8.25	@	8.50
Silesias No. 1	4.50	@	—
New Unbleached	8.00	@	8.25
Blue Overall	4.90	@	5.00
Fancy	1.75	@	2.00
Washables	1.50	@	1.60
Mixed Khaki Cuttings	2.25	@	2.30
O. D. Khaki Cuttings	3.25	@	3.40

Old Rags

White, No. 1—			
Repacked	2.90	@	3.15
Miscellaneous	2.10	@	2.25
White, No. 2—			
Repacked	1.50	@	1.60
Miscellaneous	1.25	@	1.40
Thirds and Blues—			
Repacked	1.30	@	1.40
Miscellaneous	1.15	@	1.30
Roofing Rags—			
No. 1	1.75	@	2.00
No. 2	1.50	@	1.60
No. 3 (bagging)	1.50	@	1.60
No. 4	.60	@	.65
No. 5A	.60	@	.65

Foreign Rags

All prices nominal

New Rags

New Dark Cuttings	2.25	@	2.40
New Mixed Cuttings	2.00	@	2.20
New Light Silesias	5.50	@	5.75
Light Flannelettes	5.50	@	5.75
New White Cuttings	7.00	@	7.50
New Light Oxford	4.00	@	4.50
New Light Prints	3.00	@	3.25

Old Rags

No. 1 White Linens	7.50	@	8.50
No. 2 White Linens	6.50	@	7.50
No. 3 White Linens	4.50	@	—

HIGHEST QUALITY CLAYS

LUMP and POWDERED } IMPORTED

EASTON PAPER MAKERS IMPORTING CO. INC. EASTON, PENNSYLVANIA, U.S.A.

DOMESTIC { CRUDE CRUSHED, AIR FLOATED, WATER WASHED

PRECIPITATED CALCIUM CARBONATE

CLEAN CUT

LANGSTON SLITTERS AND ROLL WINDERS

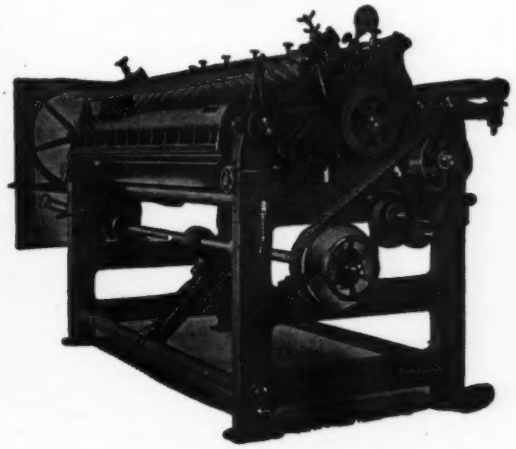
for every job from tissue to heavy board . . . narrow to wide cuts . . . small to large diameters.

SAMUEL M. LANGSTON CO., Camden, N. J.

SHEAR CUT

MODEL 28

ROLLER BEARING CUTTER



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LAWRENCE, MASS.

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SINGLE, DUPLEX AND DIAGONAL PAPER CUTTERS. CUTTER KNIVES. PATENT TOP SLITTERS.

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Special Grades for Beater and Top Sizing

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ORISKANY, NEW YORK

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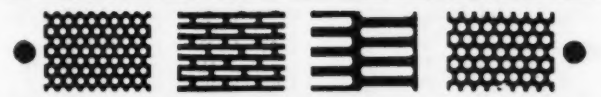

The Harrington & King PERFORATING Co.

5652 Fillmore St., Chicago, Ill. 114 Liberty St., New York, N.Y.

No. 4 White Linens.	2.25	@	3.25
No. 1 White Cotton.	4.25	@	4.75
No. 2 White Cotton.	3.25	@	3.75
No. 3 White Cotton.	2.50	@	3.00
No. 4 White Cotton.	1.90	@	2.20
Extra Light Prints..	2.00	@	2.40
Ord. Light Prints...	1.75	@	2.15
Med. Light Prints...	1.55	@	1.95
Dutch Blue Cottons.	2.25	@	2.50
French Blue Linens..	3.00	@	—
Checks and Blues...	2.00	@	—
Linsey Garments....	1.90	@	2.00
Dark Cottons.....	1.50	@	1.60
Old Shopperies.....	1.30	@	1.45
New Shopperies.....	1.45	@	1.50
French Blues.....	2.25	@	2.50

Old Rope and Bagging

All prices nominal

(Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—			
Foreign	1.60	@	1.75
Domestic	1.50	@	1.60
Wool Tares, light...	1.60	@	1.70
Wool Tares, heavy..	1.80	@	1.90
Bright Bagging.....	1.50	@	1.60
Manila Rope—			
Foreign 2.60		@	2.75
Domestic	2.75	@	3.00
Jute Threads.....	3.00	@	3.25
Sisal Strings	1.50	@	1.60
Mixed Strings....	.55	@	.60

Old Waste Papers

(F. o. b. New York)

Shavings—			
White Envelope Cuttings	2.30	@	2.40
Ordinary Hard White No. 1....	1.90	@	2.00
Soft White No. 1..	1.60	@	1.75
Soft White Extra..	2.25	@	2.40
Flat Stock—			
Stitchless	.80	@	.85
Overissue Mag.....	1.15	@	1.25
Solid Flat Book...	1.00	@	1.10
Crumbled No. 1....	.40	@	.45
Ledger Stock White.	1.30	@	1.40
Ledger Stock Colored	1.05	@	1.15
Manila—			
New Env. Cut....	1.40	@	1.50
New Cuttings.....	1.00	@	1.20
Old Kraft Machine—			
Compressed bales..	1.05	@	1.15
News—			
No. 1 White News	1.25	@	1.30
Strictly Overissue..	.60	@	.65
Strictly Folded....	.85	@	.90
Corrugated	.80	@	.85
No. 1 Mixed Paper..	.55	@	.60

Twines

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—			
India	.18	@	—
White Hemp.....	.18	@	—
Fine Polished—			
Fine India.....	.23	@	—
Unpolished—			
Box	.14¼	@	—
Paper Makers.....	.14½	@	—
Tube Rope.....	.15	@	—
Wall Paper.....	.14¾	@	—
Wrapping	.17	@	—
Soft Fiber Rope...	.16¼	@	—
Cotton	.21	@	—
(Hard Fiber)			
Medium Java.....	.18	@	—
Mex. Sisal.....	.14	@	—
Manila	.24	@	—
Domestic	4.00	@	4.50
Sisal Rope.....	2.00	@	—
Mixed Rope.....	.60	@	.80
Transmission Rope..	2.50	@	3.00
Soft Jute Rope.....	2.25	@	2.40
Jute Carpet Threads.	1.25	@	1.50
Gunny Bagging—			
Foreign .....(nominal)			
Domestic	1.90	@	2.00
Bleachery Burlap....	3.25	@	3.50
Scrap Burlap—			
Foreign .....(nominal)			
Domestic	1.62½	@	1.75
Scrap Sisal.....	1.70	@	1.80
Scrap Sisal for Shredding	2.00	@	2.25
Wool Tares, Heavy..	1.40	@	1.50
New Burlap Cuttings	2.75	@	3.00
Aust. Wool Pouches.	2.50	@	3.00
Heavy Baling Bagging	2.00	@	2.25
Paper Mill Bagging..	1.25	@	1.50
No. 2 Bagging.....	1.25	@	1.30

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints...	.03¼	@	.03½
New White No. 1....	.06¾	@	.06¾
New Light Flannelettes	.05	@	—
Silesias No. 1.....	.04	@	.04¼
New Black Silesias..	.03½	@	.03¾
Soft Unbleached.....	7.50	@	8.00
Blue Cheviots.....	.05½	@	.06
Fancy	.02	@	.02½
Washable	.02	@	.02½
Cottons—According to grades—			
Blue Overalls.....	.05¼	@	.05½
New Black, sort...	.03¼	@	.04
Khaki Cuttings.....	.02½	@	.03
O. D. Khaki.....	.03	@	.03½
Corduroy	.02¼	@	.03
New Canvas.....	.06¼	@	.07¼
B. V. D. Cuttings...	.07	@	.07½

Domestic Rags (Old)

(F. o. b. Boston)

Canvas	.04¼	@	—
White No. 1—			
Repacked	—	@	2.75
Miscellaneous	2.50	@	2.75
White No. 2—			
Repacked	1.90	@	2.00
Miscellaneous	2.00	@	2.25
Twos and Blues.....	2.25	@	2.50
Old Blue Overalls...	1.60	@	2.00
Thirds and Blues—			
Repacked	2.00	@	2.25
Miscellaneous	1.50	@	1.60
Black Stockings.....	4.00	@	4.25
Roofing Stock—			
No. 1.....	1.75	@	2.00
No. 2.....	1.60	@	1.65
No. 3.....	1.00	@	1.25

Foreign Rags

(F. o. b. Boston)

Dark Cottons.....(nominal)	
Dutch Blues.....(nominal)	
New Checks and Blues(nominal)	
Old Fustians.....(nominal)	
Old Linsey Garments.(nominal)	
New Silesias.....(nominal)	

PHILADELPHIA

Domestic Rags (New)

(Price to Mill, f. o. b. Phil.)

Shirt Cuttings—			
New White No. 1.	.07¼	@	.07½
New White, No. 2.	.04	@	.04¼
Light Silesias.....	—	@	.04½
Silesias, No. 1.....	—	@	.04½
Black Silesias, soft	—	@	.03¾
New Unbleached..	.05½	@	.06
Washable, No. 1...	—	@	.04
Blue Overall.....	—	@	.05
Cottons—According to grades—			
Washable No. 2...	—	@	.02
New Blue.....	—	@	.02
Fancy Percales....	—	@	.03
New Black Soft...	—	@	.04
New Light Seconds	.04½	@	.05
New Dark Seconds	—	@	1.50
Khaki Cuttings—			
No. 1 O. D.....	.03½	@	.04
No. 2 Mixed.....	.03	@	.03¼
Corduroy	—	@	.02½
New Canvas.....	.05½	@	.06
New Black Mixed.	—	@	03

Domestic Rags (Old)

White No. 1—			
Repacked	3.50	@	4.00
Miscellaneous	2.75	@	3.00
Thirds and Blues—			
Miscellaneous	—	@	2.00
Repacked	—	@	2.50
Black Stockings (Export)	3.50	@	4.00
Roofing Stock—			
Foreign No. 1.....	.90	@	1.10
Domestic No. 1....	1.60	@	1.70
Domestic No. 2....	1.45	@	1.50
Roofing Bagging...	—	@	1.40

Bagging

(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	—	@	1.50
Domestic	2.50	@	3.00
Manila Rope.....	—	@	4.00
Sisal Rope.....	1.75	@	2.00
Mixed Rope.....	1.25	@	1.50
Scrap—			
No. 1.....	—	@	2.25
No. 2.....	—	@	1.40
Wool Tares, heavy..	3.50	@	3.70
Mixed Strings.....	.75	@	1.00
No. 1 New Light Burlap	3.00	@	3.50
New Burlap Cuttings	2.00	@	2.25

Old Papers

(F. o. b. Phila.)

Shavings—			
No. 1 Hard White	2.25	@	2.30
No. 2 Hard White	1.90	@	2.00
No. 1 Soft White.	1.75	@	1.80
No. 2 Soft White.	1.40	@	1.50
No. 1 Mixed.....	.65	@	.75
Solid Ledger Stock..	1.45	@	1.50
Ledger Stock, white.	1.15	@	1.20
Ledger Stock, colored	.80	@	.90
No. 1 Books, heavy..	.75	@	.80
Manila Cuttings.....	1.45	@	1.50
Print Manila.....	.60	@	.65
Container Manila....	.55	@	.60
Kraft Paper.....	.75	@	.80
No. 1 Mixed Paper..	.50	@	.55
Straw Board Chip...	—	@	.50
Binders Board Chip...	—	@	.50
Corrugated Board....	.60	@	.65
Overissue News.....	.70	@	.75
Old Newspapers.....	.55	@	.60

BOSTON

Old Papers

(F. o. b. Boston)

Shavings—			
No. 1 Hard White	2.25	@	2.50
No. 1 Soft White.	1.85	@	2.15
No. 2 Mixed.....	.75	@	.80
Solid Ledger Books..	1.30	@	—
Overissue Ledger Stock	1.30	@	1.50
Mixed Ledgers.....	.85	@	.90
No. 1 Books, heavy..	.70	@	—
No. 1 Books, light..	.65	@	.75
Crumpled Stitchless Book Stock.....	.55	@	.65
Manila Env. Cuttings	1.70	@	1.85
Manila Envelope Cuttings, Extra Quality	2.20	@	2.25
No. 1 Old Manila...	.80	@	.90
White Blank News..	1.30	@	1.40
No. 1 Kraft.....	1.00	@	1.10
Mixed Papers.....	.52½	@	.55
Print Manila	.70	@	.75
Container Manila....	.60	@	.70
Old Newspapers.....	.60	@	.65
Paper Wool Strings..	.55	@	.60
Overissue News.....	.70	@	.75
Box Board Chips.....	.52½	@	.55
Corrugated Boxes....	.75	@	.80
Kraft corrugated boxes	1.00	@	1.05
Screening Wrappers.	.60	@	.70

Bagging

(F. o. b. Boston)

Manila Rope—			
Foreign	4.00	@	—

CHICAGO

Old Papers

(F. o. b. Chicago)

Shavings—			
No. 1 White Envelope Cuttings....	1.80	@	1.90
No. 1 Hard White.	1.70	@	1.80
No. 1 Soft White..	1.50	@	—
Ledger & Writings..	.75	@	.80
Solid Books.....	.45	@	.50
Blanks	.90	@	—
Krafts	.45	@	.50
New Kraft Cuts.....	1.10	@	—
Manila Env. Cuts...	Nominal		
Ex. No. 1 Manila...	Nominal		
Print Manila	Nominal		
Overissue News.....	.35	@	—
Old Newspapers—			
No. 1 Folded News	.25	@	.30
No. 1 Mixed Paper	.15	@	.30
Roofing Stocks—			
No. 1.....	1.00	@	1.05
No. 2.....	.85	@	—

TORONTO

Paper

Bonds

Direct mill shipment in two-ton lots

No. 1 White $35.50		@	—
No. 1 Tints	36.50	@	—
No. 2 White	25.50	@	—
No. 2 Tints	26.50	@	—
No. 2 Golden Rod..	27.50	@	—
No. 3 White	21.00	@	—
No. 4 White	15.00	@	—
No. 4 Tints	16.00	@	—
No. 4 Golden Rod...	17.00	@	—
Direct mill shipment in three-ton lots			
No. 5 White $10.50		@	—
No. 5 Tints	11.50	@	—
No. 5 Golden Rod..	12.00	@	—
No. 6 White	9.00	@	—
No. 6 Tints	9.50	@	—
No. 6 Golden Rod..	11.00	@	—
No. 7 White	8.00	@	—
No. 7 Tints	8.50	@	—
No. 7 Golden Rod..	10.00	@	—
Book—			
No. 1 M. F.	$7.00	@	—
No. 2 M. F.	6.50	@	—
No. 3 M. F.	5.35	@	—
No. 1 S. C.	7.25	@	—
No. 2 S. C.	6.75	@	—
No. 3 S. C.	5.85	@	—

Coated Book & Litho

Ton Lots (resale)

No. 1 .....$12.00		@	—
No. 2	10.25	@	—
No. 3	8.90	@	—
Coated tinted	13.00	@	—
Wrapping—delivered—			
Rag Brown.....	4.85	@	5.25
White Wrap.....	4.00	@	—
"B" Manila.....	4.90	@	6.15
No. 1 Manila.....	5.50	@	6.90
Fiber	5.50	@	6.90
Kraft No. 2.....	5.50	@	6.90

(F. o. b. Cars, Toronto)

News per ton—			
Rolls (contract)..)46.00		@	—
Sheets 54.00		@	—

Pulp

Ground wood.....$29.00		@	—
Unbleached sulphite.	44.00	@	—
Bleached sulphite...	54.00	@	—
Kraft	50.00	@	—
Soda	54.00	@	—

Old Waste Paper

(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut...	2.00	@	—
Soft White.....	1.75	@	—
White Blk. News..	1.25	@	1.10
Book and Ledger—			
Flat Magazine and Book Stock (old)	.70	@	—
Light and Crumpled Book Stock.	.60	@	—
Ledgers and Writings	1.00	@	—
Manilas—			
New Manila Cut...	1.35	@	—
Printed Manilas...	.45	@	—
Kraft	.95	@	—
News and Scrap—			
Strictly Overissue..	.50	@	—
Strictly Folded....	.45	@	—
No. 1 Mixed Paper..	.30	@	—

Domestic Rags

(Price to Mills, f.o.b. Toronto)

No. 1 White Shirt Cuttings	.07	@	.07¼
Light Prints.....	.03¼	@	.03½